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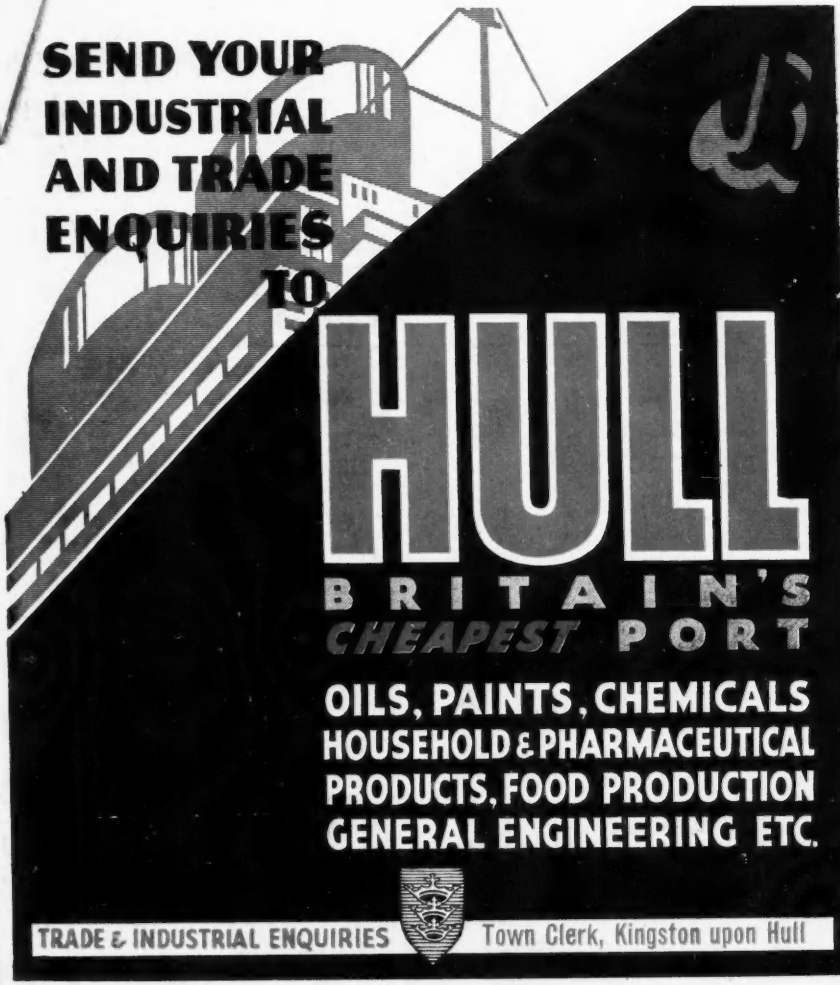

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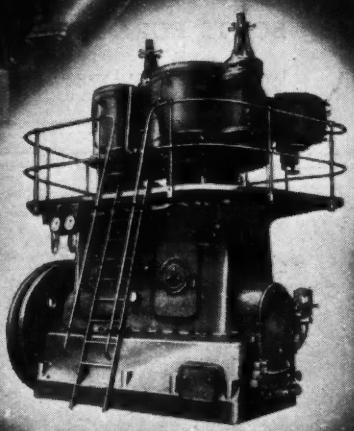

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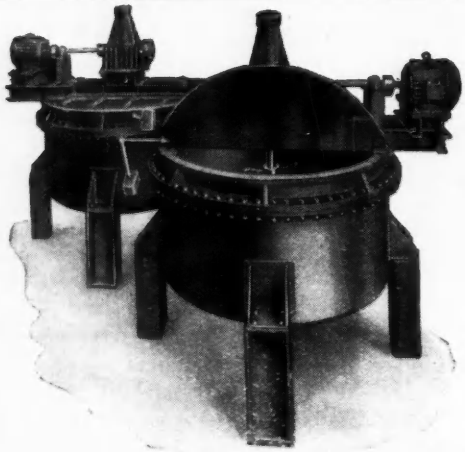

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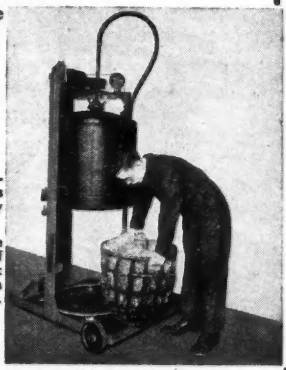

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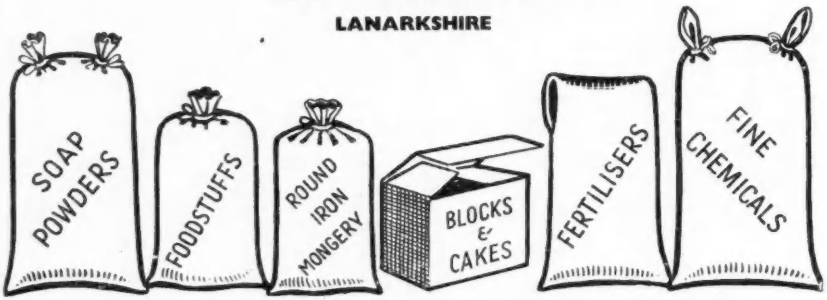

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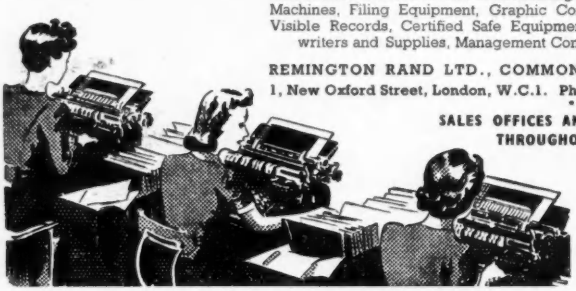

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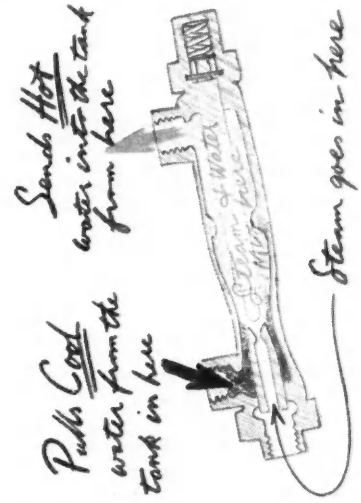

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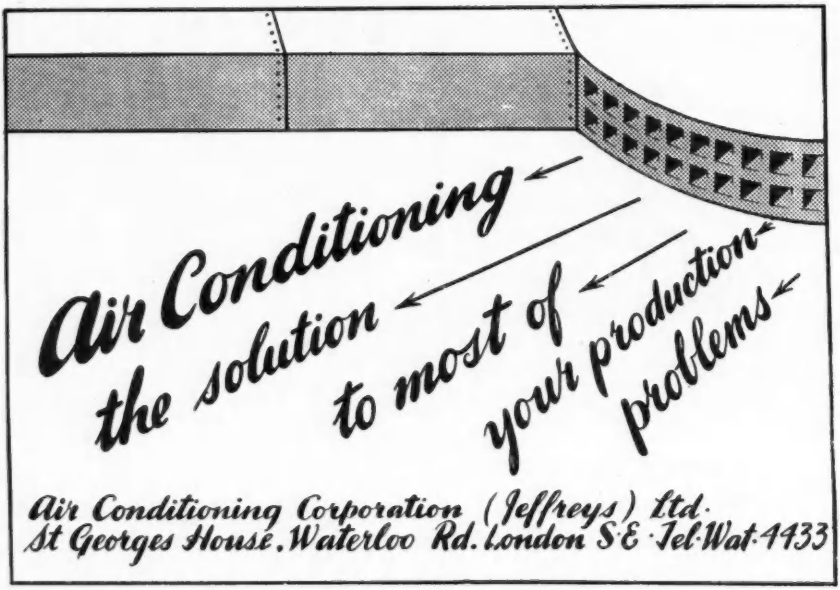

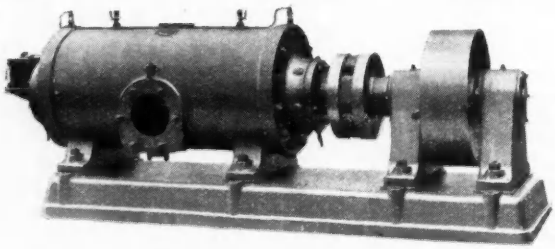

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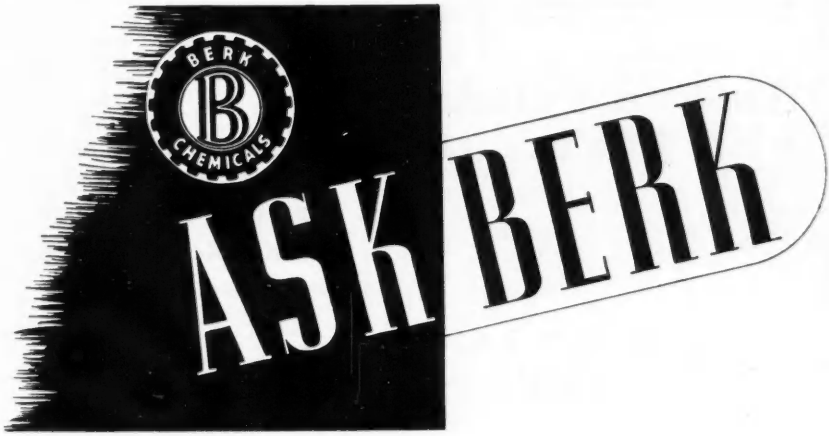

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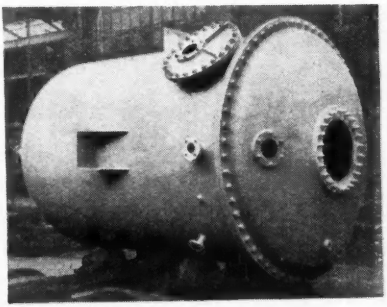

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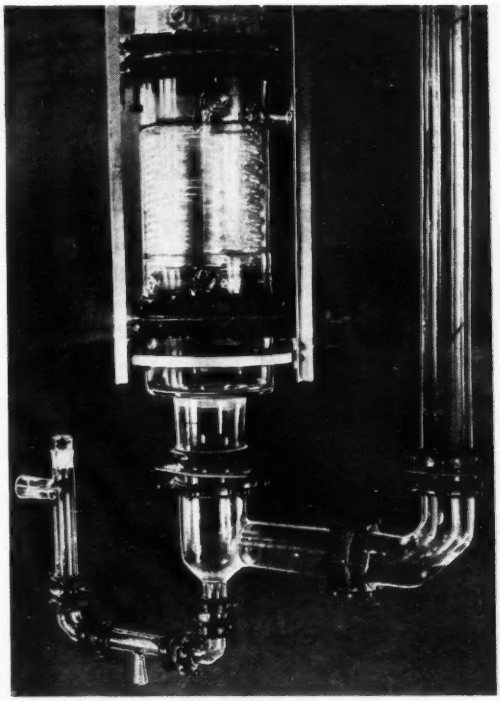

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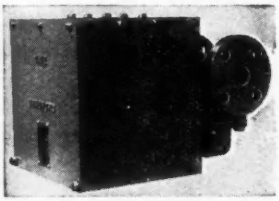

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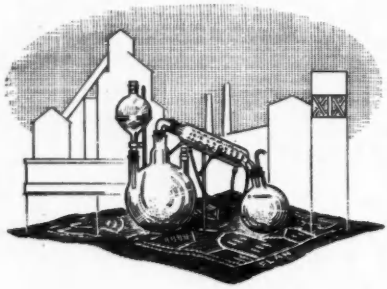

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Training for the Job

ONE of the most characteristic signs of the times is the emphasis now placed in all trades and professions upon the necessity for more and ever more training of those who aspire to enter them. Within the recollection of many now occupying higher posts in industry, advanced education or specialist training was regarded as very much the " pigeon " of the individual. Emphasis then was upon self-help, which generally meant sticking to the job and burning the candle in the small hours while learning the theory. Modern industry admittedly requires a greater degree of skill and knowledge on the part of increasing numbers. That is commonplace, and is prone to obscure the fact that there are still many jobs calling for no special intellectual or academic equipment, jobs, in fact, in which such qualities might be an actual disadvantage. We visited a famous factory a short time ago where an engineering product is turned out by mass production methods. Each man did one operation, minute after minute, hour after hour, day after day. The spectacle of partly-finished components coming along the assembly line, having another part fitted to them and passing on to the next man struck us as the type of work in which anything more than dexterity could be an embarrassment.

Those conditions of work are often spoken of disparagingly as the tyranny of the machine, but there is evidence that for thousands this is a benevolent tyranny with which they are well content. That indeed was the conclusion of a very able metallurgist, who mentioned to us his own attempt to enable men on routine work in the production of non-ferrous metals to enlarge their experience in kindred jobs. With one accord they said in effect they would rather mind their own business and let the other chap get on with his. It is not an unrelieved misfortune that such jobs still preponderate, for not everyone is gifted with brains or enterprise. But the cry that industry needs only highly trained men is, of course, a misrepresentation of the facts.

The foregoing, however, does not disprove the claim that industry needs skilled men in greater numbers than ever before. In recognition of this, there is an evident tendency to attempt to make too many silk purses from too many sow's ears. Never before have the gates of opportunity been opened so widely to youth. That has been acclaimed as one of the fruits of Socialism, which it manifestly is not. Only the shortage of skilled men has caused industry and Governments alike to encourage to the limit every young man or woman who is willing to take up the burden of study.

That policy has produced interesting results, not uniformly admirable. We recollect a wise biologist who, when asked how he wished his younger staff to be trained, replied : " The best training is none, and

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lack of experience is desirable." His juniors were expected to get their training on the job and to acquire knowledge by reading while working. Doubtless the biologist overstated the case, yet his point will be perfectly understood by those managers in industrial chemistry who prefer that assistants should learn the practical uses of their university studies exclusively in the factory. The university man habitually learns from experienced if unscholarly colleages much more than he commonly admits, even to himself. There is accordingly little doubt that an extension of the principle of encouraging younger people to study in spare time at continuation classes has much to recommend it and can be a most valuable aid to solving the difficulties created by the shortage of trained staff.

Another result of the present shortage of qualified men is the anxiety shown by many firms, industries and professions to induce boys to enter. An example of this was the recent offer by the National Coal Board of some 100 University scholarships to 18-year old boys and to young men already in the industry, to qualify for degrees or diplomas in coal mining. The value of these scholarships was up to £300 a year. Before schoolboy candidates appear before the selection panel they are being given a week at a colliery to enable them to decide if they want to work there, and the NCB to decide if they are likely to be suitable for underground work. In addition, all suitable graduates, whether NCB scholars or not, will be accorded opportunities of undergoing directed practical training in the industry. That is a practical series of steps towards ensuring that there shall be a sufficiency of trained men to take over when the time arises.

It seems more than likely that most industries in time will have to offer something similar. The obligation belongs to the industry rather than the private firm, which is liable to find, after spending money on training, that the trainee is taken by its competitor. There is generally some assurance that the bulk of those trained by an industry will stay in that industry. The scope of training is another matter. Fundamentally, it should be enough to give a good basic training and to leave individual gifts and enterprise to determine how trainees shall advance in their several stations in the industry. There can be too much indiscriminate training. It is not mere coincidence that many of the best general managers have risen step by step without any training for management other than they could procure for themselves.

NOTES AND COMMENTS

Long-Range Research

THE inestimable value of what is being done by the DSIR as an independent research organisation willing and well qualified to take up those investigations likely in a long run to afford great rewards in industry finds fresh testimony in the release by the department in the space of a few days of two full-scale reports on chemical research and on food. In "Food Investigation, 1940 to 1946" the Food Investigation Board compresses in 28 pp. and some appendices a well-balanced account of seven years' work at the three research stations at Cambridge, Aberdeen and East Malling and the London market laboratories on the scientific bases of food preservation and storage. In its scientific approach to the problem of using with maximum efficiency the most indispensable of all raw materials it promises results to which no one can afford to be indifferent. An excellent example of this is the information newly presented on the chemical and physical characteristics of butchers' meat, which, like the accompanying studies of milk, eggs, fish and fruit, almost certainly foreshadows a much more intelligent use of our severely limited foods and improvement of their quality.

Chemical Studies

"CHEMISTRY Research," the report of the Chemical Research Laboratory, DSIR, covers a realm much wider in its implications and extent of its investigations. It covers as adequately as possible in fewer than 70 pp. the wide-ranging research carried out since 1938, and more especially during 1946, in the organic and inorganic fields in which there are pressing industrial needs and no certain evidence that private investigation is likely to satisfy them. The direction of all this work by Prof. R. P. Linstead reveals that a happy balance has been struck in serving the needs of fundamental knowledge and of industrial application, and no study undertaken loses sight of the final objective. This principle is well illustrated in the reports on the work done on high polymers and plastics, on causation and prevention of metal corrosion and on coal tar derivatives. The last appears to have produced very stimulating results in a sphere which is neither new nor has been neglected by the most competent chemists in the past. The substantial enlargement of knowledge of the potentialities of several of the higher tar-derived hydrocarbons is a good example. This has brought very much nearer the prospect of making of acenaphthene another valuable source of industrial plastics. (*See p.* 13.)

"Science on Tap"

SCIENCE and scientists, unaided by any of the familiar paraphernalia of Press and public relations departments, are favoured with a continuous shower of favourable publicity which an industry might envy. Among the latest to focus a spotlight on science is the *Financial Times*, initiating this week a series of articles by its Scientific Correspondent, "The Neglect of Science," the first of which reviews for the enlightenment of the business community some of the familiar examples in recent times of neglect in this country to profit by the discoveries of British scientists, a form of obtuseness for which our commercial rivals overseas have had every reason to be grateful. Full acknowledgement is made of the leadership which chemistry has provided in the field of technology and the writer absolves the scientist from the blame for the fact that foreign technicians have so often been the first to respond. The article represents an effective warning to controllers of industry of the penalty which may be exacted if they continue to exclude scientific and technical experts from positions of authority. "The technical expert or scientist," says this observer, "is too often called in only to give an answer to a specific technical question, without having any say in important decisions. . . . 'On tap, but not on top.'"

Indian Projects

THIS week, as so often in recent months, there is news of further large-scale chemical developments in India. And,

like many of the ambitious projects previously recorded, these also exist only in the planning stage. If the prospect of all these projects being carried to a succesful conclusion were accepted here with as little question as it appears to receive in some optimistic circles in India an entirely new conception of British and Indian relations in regard to the exchange of chemicals would have to be anticipated within the next few years. In fact no such reversal of traditional relations arising out of a wide industrialisation of India is considered even remotely likely by those acquainted with the common level of industrial capacity in the Hindu State—notwithstanding the great achievements in the past of the Tata Industries—and the tremendous scale of the problems, human and material, which must be overcome before the foundation of an integrated chemical industry can be laid. Better prospects certainly exist for an expansion in the field of chemical and allied products of vegetable origin, which India's growing shortage of dollars and diminishing reserves of hard currency in general should help to stimulate.

The Facts

IN striking conflict with rumours of the impending severance of India's dependence on the West for many chemicals are two announcements from H.M. Trade Commissioner in New Delhi, one announcing the addition to the manufactures freely licensed from sterling and soft currency countries of a substantial range of drugs, paint constituents, cement and saccharine. The other message give a realistic picture of recent industrial and economic prospects. Production has heavily declined since the relaxation of British administration began and this is likely to have been greatly intensified by the tragic upheaval which followed. Part of the story is reflected in an Indian Government review of production up to December last year, showing among other items that a productive capacity of 60,000 tons of superphosphates yielded only 10,000 tons, of caustic soda (10,500 tons) 3000 tons, and of soap (250,000 tons) 85,000 tons. Such evidence as there is discourages belief in the establishment in India within a decade of anything approaching self-sufficiency in the principal chemical products.

Chemical "Conspiracy"

U.S. Allegations of Price Fixing

FOLLOWING the U.S. Federal Trade Commission's recent "cease and desist" order against the Michigan Alkali Co., Wyandotte Chemicals Corpn., and a number of other chemical companies, to bring to an end an alleged price-fixing conspiracy in the production and marketing of commercial carbon dioxide, the anti-trust division, U.S. Department of Justice has taken complementary action. It has filed a civil suit in the Federal Court, specifically charging Liquid Carbonic Corpn., Air Reduction Co., Pure Carbonic, Wyandotte Chemicals Corpn., and the International Carbonic Engineering Co. with violations of the U.S. anti-trust laws.

The FTC has alleged that dry ice sales by Liquid Carbonic Corpn., Michigan Co., and Pure Carbonic since 1933 have accounted for 75-80 per cent yearly of the total sold to ice cream makers, and in one year produced 73 per cent of all liquid carbon dioxide sold. The Department of Justice now charges the defendants with eliminating competition by price-fixing, pooling of patents and allocation of markets.

Gluten-Glycerine Paints

U.S. Process Patented

A NEW U.S. patent, No. 2,431,417, recently granted to Mr. J. H. Obey, covers methods of efficiently recovering gluten from wheat, and for using this material in the manufacture of various products. It may be used, for example, as a suspension to form special paints or protective coatings, and, as indicated in the following formula, glycerine may be used as the plasticiser:

Gluten	100 g.
Sodium salicylate	10 g.
Ammonia water, 29 per cent	3 cc.
Water	450 cc.
Sodium ortho-phenyl-phenate	1.5 g.
Glycerine	12-30 g.

The resulting dispersion is of medium-to-heavy viscosity, and can be diluted with water as required. These water-removable films are valuable as temporary masks to keep paint off selected areas. The glycerine-plasticised gluten dispersions are also useful for forming similar protective coatings on structural surfaces to prevent them from being marred or scratched by careless treatment.

PETROLEUM-BASED CHEMICALS

"Shell" Progress at Stanlow, in Holland and the U.S.A.

A SUBSTANTIAL expansion has occurred during 1947 in the manufacture of chemicals from petroleum, says Sir Frederick Godber, "Shell" Transport & Trading Co. chairman, in a statement accompanying the report and accounts.

Great progress had also been made in the construction of plant for the manufacture of chemicals which have resulted from the basic work done at the group's research centres at Thornton (near Stanlow) in Cheshire, at Amsterdam, and at the laboratories of the Shell Development Company in California.

The synthetic glycerine process in particular, which had been worked out at Shell Development Company's research laboratories, was regarded as an outstanding technical achievement, and the completion of a large plant at Houston, Texas, by Shell Chemical Corporation to produce glycerine was imminent.

Further expansion of Shell Chemical Corporation's ammonia plant at Pittsburg, California, and the group's fertiliser plant at Velzen in Holland took place this year, thus substantially increasing the production of fertilisers.

Also at Houston, Texas, Shell Chemical Corporation has a large construction programme in hand and plants are due for early completion to manufacture hexylene glycol, ethyl chloride and ethyl alcohol. These represent important additions to the production of organic chemicals from petroleum which will find a use in surface coatings, synthetic resins, textiles, perfumes, and as intermediates for the manufacture of other important chemical products.

Synthetic Detergent Plant

The chairman states that at Wood River, Illinois, the first component of a new synthetic detergent is being made, and plant for the manufacture of a complete detergent is due for construction.

Construction of the new chemical plant in the U.K. at Stanlow, to which Sir Frederick referred last year, has unfortunately been seriously held up due to the delay in receipt of equipment and materials from manufacturers. It is hoped, however, that with concentrated effort, and provided suppliers can keep to the delivery dates now promised, the plant will be completed before the end of this year.

The wide range of alcohols, ketones and other intermediates from this new plant will find extensive application in paints and lacquers, textiles, rubber, plastics, pharmaceuticals and agricultural products. The materials produced will help to supplant those now being imported into the U.K. from hard currency sources, while exportable surpluses will bring in much needed foreign exchange.

The Teepol soap plant at Stanlow, the first extension of which came into operation in the middle of last year, continues Sir Frederick, has exceeded all expectations in production, and the additional capacity planned is expected to be completed by the middle of this year. Construction of another similar soap plant in Holland is proceeding satisfactorily and should be ready in 1948.

Full Scope for Research

Turning to research, the chairman says the group has continued its leadership among industrial organisations. To find men of the highest scientific quality, and to provide the large sum with which to provide the most advanced facilities they need and the background which will give them the time and the freedom to do original research, will always be one of the foremost aims of the group. "I need not remind you that research is the company's best form of insurance without which it would be impossible to maintain our position in the industry and be at the forefront in opening up entirely new industrial fields," continued Sir Frederick.

In California, Shell Development has made valuable contributions on the more fundamental side in the field of catalysts and colloidal chemistry. The possibilities in the manufacture of chemicals from petroleum were further enlarged and many new chemical compounds were produced for the testing of their rôle in agricultura at the Modesto Laboratory in California.

In Amsterdam, work is being carried out in the field of chemical industry, the main research efforts have been devoted to detergents and plastics.

Smoke Spells Waste.—Mr. Arnold Marsh, general secretary of the National Smoke Abatement Society, told the Yorkshire Gas Coke Association at Leeds last week that smoke was a sign of hard-won coal being thrown away. The equivalent of 10 million tons of coal a year was lost in visible smoke and invisible combustion gas. The belief that "smoke spells prosperity" still lingered in some of the gloomier and more backward corners of the industrial North.

Winter Electricity Supply

1 M. kW. Deficiency Anticipated

"IF we take the average of weather for the last five years, our estimate of the shortage of plant for the peak load this winter is one million kW. and if there is an exceptionally cold spell it will obviously rise to a much higher figure at times," said Mr. Alfred Robens, Parliamentary Secretary to the Minister of Fuel and Power, in an address last week to representatives of non-industrial electricity consumers.

Mr. Robens was dealing with the peak load problem, which had been aggravated by shortage of generating plant. Demand for electric power, he said, in 1947, was 174.7 per cent of the 1938 demand.

"Plans for the transfer of industrial load for the coming winter are now before the National Joint Advisory Council," continued Mr. Robens. "Last winter industry was asked to cut its peak demand by 33⅓ per cent. I cannot yet say what the figure will be this winter, but in any case we shall ask commercial consumers to make the same contribution this winter as industry."

It was proposed to set up a small central committee representing both employers and workers in commerce, with the Regional Board chairmen or their representatives and representatives of Government departments. This would correspond to the central committee which already existed for dealing with industrial supplies and would consider any problems requiring national consideration and settlement. The Regional Boards and their district committees would call into consultation local representatives of employers and workers in commerce and set up suitable machinery to deal with their special problems.

Support for Copenhagen Fair

Nearly 1000 firms will be represented at the 1948 British Exhibition in Copenhagen (September 18-October 3). Among those contributing to provide the largest display of British goods ever held in Scandinavia will be members of the Scientific Instrument Manufacturers' Association, as well as the chemical exhibitors named recently (THE CHEMICAL AGE, June 5). The exhibition is organised by the British Import Union in co-operation with the Federation of British Industries and with the approval of H.M. Government and the Danish Government. The last all-British exhibition in Copenhagen was held in 1932 when the total area under cover was 65,000 sq. ft. The area allotted now covers more than 100,000 sq. ft.

World Power Resources

Conference at Stockholm

REPRESENTATIVES of nineteen countries recently attended a two-day meeting of the international executive council of the World Power Conference at Stockholm. The British delegates were Sir Harold Hartley, chairman of the executive council and the British national committee, Mr. Harold Hobson, vice-chairman of the British national committee, and Dr. A. Parker, director of fuel research, DSIR.

It was announced at the gathering that the fourth plenary world power conference would be held at the premises of the Institution of Civil Engineers in Britain in July, 1950, when discussions would take place on world energy resources and power production.

Delegates' Proposals

Invitations were received at the Stockholm conference from India, suggesting a sectional meeting in 1951 in connection with the congress of the international commission on large dams; from Italy and Switzerland for an "Alpine" sectional meeting to be held in 1952 or 1953; and from the Hungarian delegates, suggesting that a meeting be organised by the Danubian countries on a regional basis.

Consideration was also given to the fuel and power sections of the provisional programme of the United Nations' scientific conference on the conservation and utilisation of power resources. Constructive criticisms have been forwarded to the preparatory committee.

It was also announced at the conference that the first post-war statistical year book will be issued next month and that the next meeting of the international executive council is to take place at Brussels in July, 1949.

Chemical Members

Prominent chemists and chemical engineers who are members of the British national committee of the world power conference include Mr. C. S. Garland (Society of Chemical Industry); Mr. A. Hittinger (National Benzole Association); Dr. J. G. King (Royal Institute of Chemistry of Great Britain and Ireland); Mr. J. A. Oriel (Institution of Chemical Engineers) and Sir Ewart Smith (Association of British Chemical Manufacturers).

Record U.S. Budget Surplus.—The U.S. Treasury reported a surplus of over $7000 million at the end of the current fiscal year on June 30. This will be the largest surplus in any year in U.S. history. The previous record was $1150 million in the fiscal year 1927.

SECOND U.S. GASIFICATION TEST

Improved Yield Expected from Unmined Coal

APPROVAL has just been given of a contract between the United States Bureau of Mines and the Alabama Power Company for a second and larger co-operative experiment in underground coal gasification at Gorgas, Alabama.

The initial experiment last summer (THE CHEMICAL AGE, August 16, 1947) showed that gases produced by burning unmined coal might be a moderately fruitful source of fuel for power and raw materials for synthetic liquid fuels, which the practical elimination of mining costs rendered especially attractive.

Cost of the large-scale field test, including Bureau expenditures and those of the company, is estimated at $411,000 for a one-year period. The company provides engineering and operating services on a cost basis and will contribute, as a site for the experiment, some 300 acres of Pratt seam coal averaging 40 in. in thickness.

Drilling Already Begun

Preliminary core drilling is already in progress to determine the composition of the ground overlying the coal, which ranges from 60 to 125 ft. in depth. The next phases of the site-preparation job to be undertaken will be the drilling of five large-diameter holes to the coal bed and the driving into the bed of two parallel entries, 1200 ft. from the coal out crop and a single butt entry for an additional 300 ft. Equipment will be installed simultaneously. Site-preparation work should be completed this autumn and interested persons will be invited to inspect the underground workings before the coal bed is fired.

Experiment's Objectives

The objectives of the experiment are:

1. To determine the quantity of coal which can be gasified from a given combustion zone and the shape and the extent of the burned-out area formed.

2. To determine whether fixed outlets for product gas are practicable, either at the outcrop of the coal bed or at vertical bore holes. Various designs of inlets, outlets and seals will be tested.

3. To determine the operating characteristics of the installation under a variety of conditions.

4. To determine the quality and quantity of gas generated with an air blast under experimental conditions and, second, the quality of tar and related products.

5. To obtain information on the effect of heat on the overlying strata.

6. To obtain fundamental technical and economic information concerning plant sites, installations and operating processes.

Last year's experiment produced encouraging results, says Mr. James Boyd, director of the Bureau. It proved that combustion could be maintained and controlled, that coal in place could be gasified completely, and that the roof rock would expand and settle down behind the burning coal face without cutting off the air or gas. The gas obtained, however, was of lower heating value than desired. This was attributed to leakage of gas and air pressure through cracks and breaks in the thin (30 ft.) cover over the burning seam.

To correct this, the new experiment will be carried out at a much deeper level—100 ft. or more—and with much higher air pressures and temperatures. These factors are expected to increase the average heat value of the gas produced with an air blast from the 47 B.Th.U. per cu. ft. obtained last year to from 70 to 125 B.Th.U. Oxygen and steam can improve the gas quality further, as was shown in the first field trial when runs made with an oxygen-enriched air blast, an oxygen-air-steam blast, and an oxygen-steam blast increased the average heating value of the gas produced to 50, 110 and 134 B.Th.U. per cu. ft. respectively.

Products Used

Although of lower heating value than normal commercial gas, the product was burned successfully under a boiler. If available in quantity, it could be used to make electric power and perhaps serve for other industrial heating fuel requirements. If heating values can be improved materially, underground gasification offers a cheap source of synthesis gas—carbon monoxide and hydrogen, which is, of course, the paramount problem in making economic the manufacture of synthetic liquid fuels.

Those in charge of the new experiment will be Milton H. Fies, consulting engineer and manager of coal operations for the Alabama Power Company, and James L. Elder, chemical engineer of the Bureau of Mines. Under their plans, the parallel entries in the coal bed will be connected by a crosscut every 300 ft. At the centre of each and at the end of the butt entry, a large-diameter vertical bore hole will connect with the surface. A refractory-type fixed gas outlet and seal will be constructed at the entry portals, and the vertical bore holes also will be sealed at

(*Continued overleaf*)

New Ion Exchange Resins

" Revolutionary Developments "

RESEARCH chemists at the Resinous Products and Chemical Company's laboratories, Philadelphia, Pennsylvania, disclosed last week that they had developed a new group of ion exchange resins, said to make possible " revolutionary " expansion of the usefulness of this basic process. The development is said to permit the extraction of amino acids from packing-plant wastes. At a demonstration research chemists claimed that the new resins were of " profound importance in food, drug and other fields ranging across the chemical process industries."

Versatility

The new resins, they maintain, confer a new ability to manipulate scores of chemical compounds in hundreds of industrial applications and possess a stability and selectivity which greatly reduce the limitations of the ion-exchange process.

The result of nine years of research, the new resins belong to the group known as amberlites and have the capacity of absorbing ions over the entire *p*H range.

Some of the important industrial advantages foreseen are easy elimination of chromium and copper from plating wastes, which would effect large economies and diminish stream pollution. There is, it is said, possibility of recovering by the same means noble metals from low-grade ores or ore-refining tailings. The practicability of this has not yet been demonstrated.

Mixed Exchangers

The research chemists, at a Press demonstration, showed mixed-bed de-ionisation, the intermixture of cation and anion exchangers in the same column or tower, without impairing the functions of either. As a result, it was explained, ionisable impurities in water, for example, can be removed in a single passage through one mixed bed.

Cinchona Changes

N.E.I. Processing Agreement Ended

THE N.E.I. Government of Batavia has wound up the well-known Quinine Agreement (Kina-Overeenkomst) under which the bulk of the Javanese cinchona was processed by the Dutch quinine salt producers of Amsterdam en Maarssen and their sub-contractors resident in foreign countries, and the small balance treated in the Javanese factory of Bandoeng.

This arrangement is no longer satisfactory to the Batavian authorities because the present general politico-economic tendencies render the industrialisation of Indonesia necessary, even at the expense of Holland.

In the republican part of Indonesia, at Ponogoro, near Madioen, a new quinine factory is reported to be making 75,000 tablets and quantities of quinine salts daily.

The termination of the Overeenkomst, and the consequent increased processing of cinchona in Batavia is calculated to change the export ratio value of cinchona to cinchona derivatives (formerly 3 : 1) to 5 : 6. The Batavian authorities take an optimistic view of future prospects of Indonesian quinine exports, in spite of developments in the synthetic field and competition from other countries in cultivating the natural product.

Developments in Holland

The Dutch Yeast and Spirits Co. (Ned. Gist en Spiritusfabriek) reports that its new penicillin factory is to be extended. At present it can fulfil home requirements.

A new venture for the sale of the cellulose-derivative CMC (carboxy-methyl cellulose) which is manufactured by the Cellulose Producten I.O. of Deventer, has been established in Amsterdam.

The N.V. Vereenigde Chemische Fabrieken has changed its title to Albatros Superfosfaat fabrieken N.V., and at the same time absorbed the well-known Amsterdamsche Superfosfaatfabriek.

SECOND U.S. GASIFICATION TEST

(*Continued from previous page*)

the surface and fitted with pipe connections for attaching the air source and product gas incinerators, or gas-usage equipment.

A fire will be started in the coal bed at the bottom of one of the bore holes by dropping an incendiary bomb down the casing. Air will be forced down this bore hole under pressure by an electrically-driven reciprocating compressor with a capacity of 7300 cu. ft. per minute. Gases will be drawn off at the next bore hole or one farther down the entry if desired. Temperature and pressure measurements taken at small test holes will determine the progress of the fire.

If, as expected, the coal burns out between the bore holes in a cigar-shaped cavity, additional bore holes will be drilled from the surface to the widest points of the cavity curves. These holes, in turn, will be connected to the system as air inlets. In this way the possibilities of using a vertical bore hole system to propagate the gasification over a wide tract of coal land will be determined.

RADIATION HAZARDS IN INDUSTRY

Suggested Safety Measures

AN important aspect of atomic research which remains the subject of ill-informed speculation and "sensational disclosures" is the safety of workers handling radio-active materials.

At a Press conference in Glasgow a fortnight ago, in connection with the installation of a 150-ton synchrotron at the University there, Prof. P. I. Dee, who is in charge of research, was obliged to answer "ridiculous statements" made about the danger to human life in the neighbourhood.

Many of these misconceptions are dealt with in a pamphlet on the protection of workers from radiation hazards, prepared by the Atomic Sciences Committee, Association of Scientific Workers, and published by the Labour Research Council.

A foreword to the publication points out that the great majority of those working with radiation sources for the past 50 years have run no appreciable risk and are not likely to do so in the future. The principles of protection based upon half a century of experience are well known to research workers and it is now largely a question of adaptation and extension.

Possible Hazards

Describing radiation dangers in industry, the pamphlet states that from the worker's point of view these may be divided into two groups: those arising from radiation entering the body from external sources and those from ingestion of active substances.

External radiation may result from the actual operation of an atomic pile, which gives rise to an enormous release of gamma- and beta-rays and neutrons; large-scale handling of the by-products of the pile, where the danger is mainly from beta- and gamma-rays; general laboratory operations involving radioactive substances whether naked or enclosed in glass or metal vessels; and, finally, skin or clothing which is contaminated with active substances

In the case of the ingestion of radio-active dust, or gas, much depends on exactly what is ingested. Some radio-elements, such as uranium, break up only very slowly; their radiation is therefore only feeble and the resulting damage is slight. Others, such as plutonium, break up relatively rapidly and are therefore strongly radio-active and far more dangerous. A milligramme of uranium ingested into the body will never be noticed; a milligramme of plutonium will kill, since the radiation which it emits in a month is as great as that emitted by the same weight of uranium in many thousands of years.

It is stressed that danger may also arise from the escape of radio-active gas into the atmosphere, or of active liquor into sewage effluent.

Suggested Precautions

Dealing with precautions, the report emphasises that safety equipment must be adequate and not a "makeshift" arrangement. Ample shielding of lead (three-inch lead walls) or, for special purposes, of concrete, should be provided. Where any possibility exists of producing dust or fumes, the operations should be conducted in enclosed cabinets, under draught, and all cleaning should be done by a wet method.

The pamphlet recommends three general safety principles to be followed by chemists and process workers in handling radio-active substances:—

1. The materials should never be handled by anyone unacquainted with their properties. Where sealed materials are being used, someone experienced in the handling of the naked materials should always be immediately available in case of mishap.

2. No operation should be commenced unless the time and equipment available (screenage, fans, gloves, forceps, etc.) are adequate, not merely for the purpose envisaged, but also for unforeseen happenings or accidents.

3. At all stages of operation, everyone concerned should have an adequate knowledge of the quantity of active material present, and the precise way in which it is dangerous (beta-days, neutrons, gaseous emanation, etc.)

Accident Procedure

Pointing out that it is impossible to generalise upon safety precautions, the report concludes by suggesting that the following action should be taken in the case of a broken container:—

Warn others nearby to keep away if their assistance is not required by the accident and at the same time, quickly put on gloves and mask.

If spilt material is liquid, throw something over it to soak it up (flannel, filter paper sheets, etc.). If dusty, quickly damp down with water, avoiding leakage to drains and, if possible, cover with a wet towel, or if very dusty, switch off fans.

(*Continued on page 11*)

New Supplies and Appliances

Solid Rubber Construction in New Ball Mill

CLAIMS of high abrasion resistance offered by a ball mill with a body made entirely of compressed "Linatex" rubber, are mentioned in "Rubber Developments," June, published by the British Rubber Development Board. The mill is suitable for both dry and wet millings.

The new mill is described as an improvement on the type lined with sheet rubber, in which difficulty was sometimes found in securing the lining against the heavy load in shear caused by the grinding charge in action on the actual bond to the metal.

With the new machine the charge on highly abrasive materials, such as vitreous enamel frits, has been reduced more quickly than has proved possible with other grinding methods—a fact attributed to improved cascading of the balls against the more resilient rubber and to prevention of adulteration of the charge, which may occur where particles of a cylinder liner are worn away.

The mill consists of two end-plates protected with "Linatex" rubber and connected by steel tie-rods. Rings of rubber are threaded over the rods and held in compression by the end-plates when bolted together. This method of construction is claimed to give increased abrasion resistance advantages, and in particular the use of rubber in compression represents the ideal conditions for maximum durability.

Each mill is fitted with a quick-release hand-hole and mounted as a complete unit with self-aligning ball bearings, reduction gear and electric motor. Alternatively, standard cylinders can be supplied to make a battery of mills in line, each cylinder having a detachable end-plate and picking up a drive from rubber-tyred driving rollers. Any cylinder can then be removed by means of trunnions at each end without disturbing the others.

For small batch grinding or laboratory work, a mounting enables the mills to be rapidly changed, making it possible in the case of expensive ingredients to retain a mill for each type of material ground.

Preventing Steam Losses

CERTAIN public utility undertakings which are large users of steam, have paid tribute to a leak-sealing compound—Furmanite. It is a rubber-base material—containing a high percentage of metal and a small percentage of graphite—which can be used to seal sealing flanges, etc., obviating the necessity of a "shut-off" for repairs, or an irremediable steam loss (with consequent loss of efficiency) for long periods.

Application is by pressure-gun, and the compound melts at steam temperature. The steam heat then vulcanises the compound to form a permanent seal.

Synthetic Resin Adhesive

A SYNTHETIC resin adhesive for bonding such materials as metals, glass, and porcelain, and which will set under the application of heat alone, without addition of hardener, is the subject of a leaflet circulated by Aero Research, Ltd., Duxford, Cambridge. This concern markets the product in Britain on behalf of Ciba, Ltd., Basle.

The material—"Araldite"—is stated to promote easy bonding by the absence of water or other volatile substance during the setting process, and to possess exceptional endurance under severe conditions, being often stronger than the materials it bonds.

U.S. Moulding Aid

A NEW lubricant and moulding agent, Diglycol Stearate S, manufactured by Glyco Products Co., Inc., U.S.A., is now being used in the moulding of water-dispersible powders into blocks, tablets and pellets. A 10 per cent water dispersion of the stearate is made by heating to approximately 65° C. and mixing until a uniform fluid is produced. About 5 per cent of this fluid is then added to the powder. The 10 per cent dispersion of Diglycol can be adeed directly to powders in water dispersion in concentrations of about 0.5 per cent Diglycol Stearate S based on the dry powder. This is then dried, powdered, placed into the moulding machine and pressed cold. The company claims that the use of this stearate permits faster injection, assists cohesion and prevents sticking, breaking and surface imperfections.

Turkish Trade.—The second volume in a series of overseas trade surveys, "Turkey, Economic and Commercial Conditions 1947," was published last Monday, price 4s., by HMSO, on behalf of the Export Promotion Department, BoT. It covers all aspects of finance, foreign trade, agriculture, industry and communications.

Chemical Risks in Non-Chemical Works

Potential Dangers Not Fully Recognised

THE close interest attaching to all means of promoting industrial safety was convincingly demonstrated at the National Industrial Safety Conference which the Royal Society for Prevention of Accidents recently organised at Scarborough, the first "residential" conference of its kind to be held since 1939. The attendance included Mr. G. P. Barnett and Mr. J. I. Hamilton, H.M. Chief Inspectors of Factories in Great Britain and Northern Ireland, respectively, and Mr. J. G. Wheeler, of the International Labour Office.

Among a number of interesting papers read was "Chemical Hazards in Non-Chemical Works" by Mr. A. Webster, Safety Officer of the Association of British Chemical Manufacturers.

Mr. Webster said that a chemical was bought and used because it had some inherent property that enabled it to produce a certain desired result in the purchaser's works. This particular property was one in which the purchaser was primarily interested and might easily be the only one with which he was acquainted. That property might not make the chemical hazardous, but there were other properties that might definitely be hazardous, and it was essential that users of chemicals should sufficiently acquaint themselves with the products they handle to enable them to protect their employees.

"There still seems to be a wrong impression as to the relative dangers of acids and alkalis," observed Mr. Webster, "but anybody with experience of both classes of substances will agree that both are hazardous. It is difficult to see why this idea that alkalis are harmless has arisen, except that an alkali is regarded as being the reverse of an acid. The handling of alkalis requires rigid precautions and it is essential to adopt the rules laid down by the suppliers."

Acids could be divided—from the safety aspect—into three broad classes: those that were normally solids, those that were normally liquids of approximately the same viscosity as water, and those that had the consistency of syrup, *e.g.*, strong sulphuric acid and strong phosphoric acid.

Generally, acids which were solids were not very corrosive, and could be handled in the same way as other solids, although they had their individual hazards—for example, oxalic acid was poisonous. Acids in liquid form were often gases dissolved in water, and these gases rapidly escaped if the liquid were heated. The syrupy acids had their own hazards, mainly due to the fact that they do not mix easily with water.

Despite the wide use of solvents and esters, there was relatively little information available on their hazards. For degreasing, the present tendency was to use non-inflammable substances, which led to the use of chlorinated rather than non-chlorinated compounds.

Recent published work suggested that prolonged heating of the chlorinated compounds at or near their boiling points resulted in the giving off HCl vapour.

Water, which was generally regarded as innocuous, was capable of dissolving a very large number of substances, and had to be watched. For example, if bags of a material soluble in water were piled on the floor where water could get at them, there would be a dissolving action which, if not checked, might cause a stack of bags to collapse. Water was also an almost universal solvent for salts.

Solutions of salts had acquired a reputation for being harmless, but this was illusory. They could cause dermatitis.

The use of refrigerants was becoming increasingly popular, and most of them were toxic. Makers of refrigeration plant should be asked to indicate definitely the nature of the compound used in the system, and to indicate the hazards.

RADIATION HAZARDS

(Continued from page 9)

The danger thus localised, evacuate the laboratory, lock it, and send for expert assistance. Do not attempt to do anything more unless your training and experience qualifies you to take charge of the situation, but if the accident has happened in the open air, and there are no doors to lock, remain on hand to give warning to passers-by.

Where a process worker has been involved, his clothing should be checked immediately for contamination by means of apparatus which the institution concerned must keep for the purpose. Contaminated skin should be thoroughly and repeatedly washed in running water, and hot baths must be available for more serious cases. If hair is proved by testing to be contaminated it should be lightly damped and shaved off. Washing will only serve to contaminate the scalp.

EMULSIONS AND EMULSIFICATION

Substantial Fields Awaiting Investigation

by A. E. ALEXANDER

IN analysing the physico-chemical factors involved in the formation and stabilisation of emulsions, two general lines of approach are possible. The classical one takes the system as a whole, and endeavours from its gross behaviour to elucidate the phenomena at the particulate surfaces. The other, with which we are concerned, attempts the converse, and considers the problem from the angle of interfacial phenomena. The two approaches are essentially complementary and should eventually present us with an integrated description of emulsion systems.

Of important questions in the formation and decay of emulsions, three are of particular interest in connection with interfacial phenomena—the adsorption of emulsifying agent upon an enlarged interface made by mechanical means, the structure of the stabilising film and its rôle in gross stability of the emulsion, and finally the desorption of the emulsifying agent during the apparently inevitable coalescence of the emulsified droplets. In considering these problems a good deal concerning the oil/water interface has to be inferred from studies upon air/water systems, owing to the limited data for the former type.

The kinetics of adsorption can be followed by measuring the interfacial tension as a function of time. For slow rates the ordinary static methods are applicable, but for rapid adsorption dynamic methods are essential.

Dynamic Techniques

Because of experimental difficulties most data refer to adsorption at the air/water interface, utilising such dynamic techniques as the impinging jets, oscillating jets or surface potentials. The surface tensions are converted into surface concentrations, thus enabling the observed rate of adsorption to be compared with that calculated from diffusion theory. Very marked discrepancies are observed, with soap or dye solutions. For example, the ratio of the calculated to the experimental rate is often many thousand, indicating a high energy barrier to adsorption. Of the contributory factors the most important appears to be that associated with the penetration into the surface film of the hydrocarbon part of the adsorbing molecule.

As might be anticipated, the desorption from interfaces of long-chain molecules is also a very slow, hindered process, and this may lead to the solute molecules actually separating out on the surface as a three-dimensional phase on rapid compression of an adsorbed film. Unfortunately, our present knowledge of the factors involved in the desorption process are very meagre, and much needs to be done on this aspect.

Concerning the structure of the stabilising film in emulsions, in particular whether it is mono- or multi-molecular, surface chemistry is able to provide a rather definite answer in most cases. With the water-soluble soaps (including detergents, wetting agents, etc.) which promote the O/W type of emulsion, the adsorbed film is certainly no more than mono-molecular in thickness, for the adsorption computed on this basis agrees very closely with the experimental values obtained by the microtome and other methods.

Stability Determination

The monolayer is in a very compressed gaseous (and hence fluid) state, the oil phase being almost entirely eliminated from the interface. The degree of stability imparted to the emulsion appears to be determined by the lowering of the interfacial energy produced by adsorption, and by the viscosity of the adsorbed monolayer.

With the oil-soluble soaps, on the other hand, such as calcium and magnesium oleates, promoting W/O emulsions, the equilibrium spreading pressures are much too small to give stabilisation by a monolayer. Emulsion stability must then come from three-dimensional solid particles at the interface, in agreement with the conclusions reached by Pink from bulk studies.

Proteins are important stabilisers for O/W emulsions. Studies of monolayers and of adsorbed films at A/W and O/W interfaces show that stabilisation arises from the spontaneous formation of multimolecular elastic membranes. Little is known of this process, termed "surface denaturation," despite its great industrial and biological importance.

The question of the thermodynamic stability of emulsions is closely linked with the nature of the stabilising film. Experimentally it would appear that all emulsions so far prepared coalesce at a greater or lesser rate on keeping, indicating that they are all thermodynamically unstable.

Summary of a paper by Dr. A. E. Alexander, Assistant Director of Research, Colloid Science Dept., Cambridge, to a joint meeting at the Royal Institution of the London and South Eastern Counties Section of the Royal Institute of Chemistry and the London and Home Counties Branch of the Institute of Physics.

COAL-TAR PLASTICS

Promising Results of CRL Research

PROGRESS of considerable significance in the plastics field is among the very promising results recorded or forecast in the current report on the work of the Chemical Research Laboratory, DSIR, summarising what has been done since the last account was rendered before the war.*

In all fields, work has been greatly facilitated and extended in the period under review by the provision of new instruments, which now include a Hilger double-beam spectrometer and a Hilger medium quartz spectrograph.

The overriding policy of the CRL is to carry out research in those fields not covered by industrial chemical research and the avoidance of duplication is necessarily not easy. This is reflected by the fact that in more than one department it was found at a late stage that equivalent studies had been in progress elsewhere. It is mentioned that while a patent application covering polymers and copolymers of acenaphthylene was in course of preparation a prior specification (British Patent Application No. 24441/45) covering the same ground became open to inspection at the Patent Office.

Of these studies, the report says: Several of the higher hydrocarbons of coal tar have so far found no established large-scale industrial uses, although they are present in crude tar in quite appreciable amounts. Prominent among these is acenaphthene, which is present to the extent of about 1 per cent, and which can be readily extracted. The dehydrogenation of acenaphthene to acenaphthylene and the polymerisation and copolymerisation of acenaphthylene have been examined as a possible way of utilising acenaphthene to give industrially valuable plastics.

Experimental Catalysis

Acenaphthene has been passed over a series of catalysts at temperatures ranging from 500° to 750° in a stainless steel reaction tube with a preheater. In the early experiments an inert gas, *e.g.*, nitrogen, was passed over molten acenaphthene in a vaporiser, and the vapours were then led over the heated catalyst. Under these conditions there was some conversion to acenaphthylene, but the product was highly contaminated with complex, fluorescent, pyrolytic products of acenaphthylene, notably chalcacene.

The use of steam as a diluent, by eliminating most of the undesirable side reactions, led to a marked improvement in the quality of the product and the degree of conversion. Using a zinc molybdate-magnesia catalyst with steam at 595-600° C., 100 gm. acenaphthene gave 97 gm. of yellow product, which contained 67 per cent acenaphthylene.

The nature of the compounds other than acenaphthylene in the dehydrogenation product was established by polymerising the acenaphthylene in glacial acetic acid with concentrated hydrochloric acid (to give the acid polymer and some biacenaphthylene), making alkaline and then steam distilling the mixture. In the above case the sole contaminent was unchanged acenaphthene.

Zinc Oxide Catalysts

A series of catalysts comprising mainly zinc oxide with smaller amounts of aluminium oxide and other additives has also been examined for the dehydrogenation reaction. With one of the catalysts the degree of conversion per pass has been increased to 90 per cent, but with certain members of the series, and particularly at the higher temperatures, there appears to be a marked tendency for the five-membered ring to rupture, giving in some cases naphthalene, in others both naphthalene and a α-methyl naphthalene.

Analytical methods have been developed for the estimation of acenaphthylene in the presence of acenaphthene, naphthalene and α-methyl naphthalene. Three methods have been successfully employed: (a) quantitative hydrogenation, using a Raney nickel catalyst, (b) colorimetric determination with the Spekker photoelectric absorptiometer, and (c) ultra-violet absorption spectroscopy.

A preliminary survey has been made of the polymerising characteristics of acenaphthylene. High molecular weight polymers have been prepared by thermal polymerisation with or without solvents and with or without catalysts such as benzoyl peroxide.

The use of ionic catalysts of the Friedel Crafts type, *e.g.*, boron trifluoride or aluminium chloride at low temperatures, also furnishes high polymers. Copolymers have been prepared, notably some with styrene. Prominent characteristics of the polymers of acenaphthylene are heat stability, high softening temperature and good electrical properties.

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*Abstracted from "Chemistry Research—1938-1946," the report of the Chemistry Research Board (DSIR), 1938-1946, and of the Director of the Chemical Research Laboratory for the year 1946. HMSO 1s. 3d. net.

Widening Use of Titanium Minerals

A Promising Source of Metal and Pigments

DISCOVERY of an extensive, easily accessible deposit of titanium minerals, source of the whitest of paint pigments and from which the U.S. Bureau of Mines has developed a method of producing a white metal twice as strong as mild steel with very high corrosion resistance is revealed in Report of Investigations 4208. The deposit is in the vicinity of Highland, Clay County, Fla. Drilling disclosed an area of titanium-bearing sand from 3000 to 8000 feet wide and about 19 miles long.

The titanium minerals in the deposit include the arizonite variety of ilmenite. In addition, the deposit includes other valuable heavy minerals—zircon, monazite, kyanite, sillimanite, and minor amounts of many others.

Because titanium minerals are so common, titanium is one of the most readily available metals that could be used for structural purposes. Its usefulness was limited until recently, because in the form in which it was available it was very brittle, and so hard that it would cut glass. Development of a method of producing ductile titanium, which can be drawn into wire and rolled into thin sheets, has opened up new fields of usefulness which the Bureau is co-operating with industry to explore.

Titanium Pigments

According to Mr. W. J. O'Brien, vice-president of the Glidden Company, Cleveland, Ohio, addressing members of the American Institute of Chemical Engineers at a recent meeting, titanium pigment production is rapidly assuming a rôle of increasing importance among U.S. industries.

Industrial Applications

Reviewing recent developments, Mr. O'Brien stated that this progress was attributable to the expanding use of titanium pigment in the production of a wide variety of articles and cited a recent application in the development of a new type porcelain enamel which promised to give a more beautiful finish and greater durability than previously attained Technical advances in manufacturing processes, in which the chemical engineer had played an important part, had raised the status of titanium pigment from an expensive "laboratory curiosity" 30 years ago to a commodity possessing a variety of commercial applications.

Mr. O'Brien pointed out that demands for titanium dioxide had increased to such an extent that there was an acute shortage in the U.S. at the present time The principal properties of the product—chemical inertness, fine texture and high covering power—enabled it to be used for many different purposes including the manufacture of paints, fine paper, cosmetics, nylon and rayon stockings, linoleum, soap, rubber, plastics, and cement.

EUROPEAN SOURCES OF BROMINE SURVEYED

ACCORDING to J. Mir, mining engineer, writing in *Afinidad*. 1948, *25*, 351-5, the earth's crust contains 10^{16} tons of bromine, and 10^{15} tons iodine. Bromine containing minerals are few, the principal being the silver halides, such as AgBr (bromo-argirite), Ag(Br, I, Cl) (iodobromite), Ag(Cl,Br) (embolite), and ammonium bromide or bromo-ammonia (NH_4Br). Bromine is also found in very small amounts or traces in bromo-carnalite, silvinite and possibly other potassium salts as isomorphous mixtures.

Interest has hitherto centred mainly on the French and German potash deposits, but there are also some of appreciable extent in Spain, as in the Llobregat basin, where the bromine content of the silvinite approximates to that of the German salts, about 0.12 per cent. Associated with common salt in the same neighbourhood, the bromine content may be 0.027 per cent, and with potassium chloride as much as 0.274 per cent.

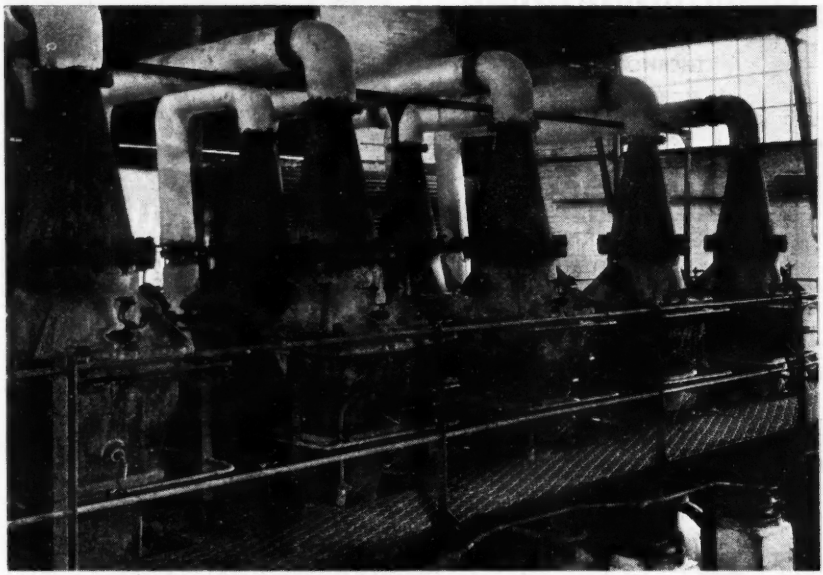
Further surveys are now being made, and so far they indicate much higher percentages. Spanish carnalite may contain up to 0.241 per cent bromine.

Some of the earlier literature of the subject is reviewed and well established methods of extraction described, *e.g.*, those of Frank, Kubiersenky, Kaltenbach, and Van Meulen.

New Companies Index.—Anglo-Saxon Petroleum Co. is accredited with the largest nominal capital (£141 million) in the new index of British companies at the Companies Registration Office in Bush House, The Strand.

Metallurgical Section

Published the first Saturday in the month



Ammonia Burners of the atmosphere pressure ammonia oxydation plant of Imperial Chemical Industries Ltd., at Billingham. These are fitted with 10% rhodium-platinum catalyst gauzes mounted between the rectangular flanges.

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Metallurgical Section

3 July 1948

SPANISH IRON AND STEEL

Official Plan to Enlarge Home Resources

FACED by the necessity of supplying from home resources a greater proportion of the steel which can no longer be obtained in adequate quantities from foreign sources, Spain is taking steps to establish her iron and steel industry on a substantial basis. Its scope in the past is represented by the peak figures in 1929 of just over 1 million tons of steel and 750,000 tons of pig-iron, which in 1946 had dwindled to 617,000 tons and 489,000 tons, respectively.

The Government, in collaboration with the iron, steel, and engineering industries, has now ordered a full investigation of all the possibilities of increased production.

The first part of a report based on these inquiries has recently been published in *DYNA (Revista de la Asocn. Nac. de Ingenieros Indust. de España)*, March, 1948, pp. 103-109.

Spanish coal production in the past few years has increased from an average of some 6 million tons before the war to just double that figure in 1946. Although much of this coal is said not to be very suitable for metallurgical coke, it is thought that by judicious treatment, washing, blending, and admixture with foreign coal it will be possible to furnish the metallurgical industries with sufficient of the kind of coke they require.

Dwindling Ore Supply

The report contains a list of the principal firms engaged in steel manufacture in the various provinces under the three categories: blast furnaces, Bessemer and Siemens plants, and electric furnaces. Total capacity of the first two is about 2.2 million tons, in Vizcaya, and the Asturias. Electric furnaces are mostly in Guipuzcoa, Barcelona, and Santander.

Figures for iron ore mining indicate that in recent years there has been a decline from the 1900-1914 average of about 9 million tons to only 2 million tons. The output for 1946, 2,365,000 tons, was exceptional.

It is proposed that the national plan should include a thorough survey of Spanish ore and coal supplies. Coal reserves have been estimated at 3500 million tons, but this figure needs confirmation by a more precise geological study.

Supplies of scrap for the furnaces are as acute a problem in Spain as in other countries. From home sources it is said that no more than 100,000 tons can be expected annually, and the iron and steel industry will have to look to foreign sources—if any are available.

There are virtually no substantial sources of ferro-alloys (of maganese and silicon), excepting possibly some mangani-ferrous ores in Huelva and Cartagena. For these and for refractories it is recognised that adequate supplies cannot be provided without outside aid. A few firms have attempted the manufacture of refractories in recent years, despite the lack of suitable raw materials in Spain, and they are likely to have every possibly support and encouragement.

Low Consumption Level

The home market for steel is at present very poor. Annual consumption of steel per head, which was only 26 kg. before the revolution, is now no more than 40, as compared with 46 in Italy, 136 in France, 102 in Germany, and 185 kg. in the U.S.A. There are, of course, several directions in which use of steel is at an artificially low level, *e.g.*, the railways, building—especially houses—and agricultural and other machinery.

Excepting a few relatively large firms specialising in agricultural machinery, the general supplier of Spanish farmers who practise any sort of mechanisation at all is the village blacksmith or his equivalent. Collectively, that is an extravagant method of supplying agricultural metalware.

It is expected that in a more progressive economy, home demand for steel will soon reach the level of 50 kg. per head, especially if, to the consuming industries noted are added shipbuilding, the electrical, automobile and other engineering industries. Then, it is estimated, total consumption will reach 1.5 million tons a year.

Overcoming the World Steel Shortage

International Agreement on Wider Distribution of Materials

DELEGATES from 15 European countries, the U.S.A. and the Union of South Africa recently attended a meeting of the Steel Committee of the United Nations Economic Commission for Europe at Geneva.

For three days the conference discussed the difficulties which are retarding Europe's steel production and agreement was finally reached upon the international distribution of metallurgical coke for iron and steel manufacture. An appeal was also made to exporters of steel-making equipment, to make larger quantities available to European steel industries. The shortage of rich iron ores was also discussed and the conference recommended that increased deliveries should be made available to European steel producers.

Conserving Resources

In view of the probable shortage of manganese ores next year, the committee suggested that all ores suitable for the production of ferro-manganese should be strictly reserved for that purpose and not employed for the production of pig iron.

After the South African delegate had pointed out that if structural steel was made available for railway wagons the Union could substantially increase her exports of ore, offers of steel for this purpose were made by Belgium, France and Luxembourg. The U.K. representative added that Britain was investigating various methods of solving South Africa's transport problems.

As a result of the meeting a panel of scrap steel experts will visit various countries to exchange information on the best methods of collecting and preparing scrap in order to increase output of steel, while, at the same time, economising in the use of coke. The panel will include representatives from Belgium, Czechoslovakia, France, Italy, Netherlands, Switzerland, Britain and the U.S.

During a preliminary survey of the scrap position it was found that Germany was the only country possessing a large scrap surplus, estimated at about 10 million tons. Under a new arrangement announced by the Joint Export-Import Agency, dealers will get 15 per cent of the proceeds resulting from scrap exports and part of this allotment will be utilised for the purchase of extra scrap-processing equipment.

For some time past German dealers and shippers have been reluctant to export scrap because of the absence of stable exchange rates, and the new financial arrangement is expected to overcome this difficulty.

In addition, a Washington report states that a team of U.S. experts is soon to be sent to Germany to assist in the expansion of her steel production.

World Metals and Chemicals

Uno Estimate of Requirements

PRODUCTION in the iron and steel, engineering and chemical industries of European countries, excluding Germany, is roughly estimated to have been worth $10,000 to $13,000 million in 1939. This is one of the facts brought out in "A Survey of the Economic Situation and Prospects for Europe," the work of the Economic Commission for Europe, UNO, which has been summarised by the *Board of Trade Journal*.

An increase of $2000 million, which according to the present calculations is needed to close the balance of payments gap, would therefore amount to 15-20 per cent of annual pre-war output.

If allowance is made for a probable permanent fall in German production and for enlarged home requirements of producing countries needed to sustain higher levels of overall production, the total increase of production needed in these three groups of industries is of the order of 40-50 per cent of 1938.

60 Per Cent More Steel

Existing plans of European countries (Other than Germany and the U.S.S.R.) allow by 1951 for an increase of 54 per cent over 1938 in the production of crude steel and of 60 per cent in finished steel. Electric power is to be increased by 46 per cent over the same period. Coal is planned to increase only by 16 per cent, but to compensate for this, larger coal exports than pre-war are planned from Germany.

If these plans are fulfilled the conditions necessary for a self-sustaining European economy in the early 1950's should be realised, provided agricultural production is restored to its pre-war levels and the present abnormally large imports of manufactured goods are dispensed with. Plans for the 16 ERP countries envisage, however, that imports of manufactured goods from the U.S.A. will still be running considerably above the pre-war level in 1951.

A WIDENING FIELD FOR ZINC

Record 1947 Production in U.K.

CONSUMPTION of virgin zinc in the U.K. last year, says the 1947 Report of the Zinc Development Association, totalled 220,000 tons (a peacetime record), of which 68,000 tons were provided by U.K. production. Imports came from all over the world, and 1947 saw the first shipments from some of the pre-war sources, such as Poland. Nevertheless, more than half the total supplies of slab zinc came from dollar areas.

Manufacturers of standing now realise the importance of zinc alloy die-castings in quantity production, and accept them as engineering components. More than 20 million zinc alloy die-castings are now made every week, and many new dies have been coming into production. The motor-car industry in particular uses a great many more zinc alloy die-castings than ever before. The largest casting is the radiator grille—a comparatively recent adoption in the British car and a feature in the present models of the Austin and Standard companies.

Consumption of zinc in the manufacture of oxides fell slightly during 1947, owing to shortages in the supply of virgin zinc, and the Ministry of Supply restriction of production to 80 per cent of the 1946 peak.

There was no lessening in general demand which exceeded supply both in the home and export markets. The latter, says the report, were hampered by insufficient export quotas, and by some recent disinclination on the part of foreign countries to grant import licences.

Lithopone

The production of lithopone continued on much the same scale as before the war, although new plant operation is expected to raise the level of production considerably. The quantity set aside for export is very small, since lithopone is considered to be more useful as an ingredient in finished products for the export market. There have been no important changes in the use of lithopone of which large quantities are used in the paint industry and in rubber, linoleum, and cables.

Consumption of zinc dust rose a little towards the end of the year, but production was not quite sufficient to meet the demand owing chiefly to shortage of fuel. In particular, the use of zinc metal pigmented paints has increased and further developments in this field are expected.

Hot-dip galvanising remained the chief interest in the field of zinc coatings. Many new plants were built, frequently with the assistance of the association's design experts. In this connection, the emphasis was on the improved methods of heating the galvanising baths, and on the installation of thermostatically controlled systems using coke, coal, and gas heating. Overseas inquiries included heating by electrical means.

Technical progress continued steadily, the use of pyrometers (often in conjunction with thermostatic control) being now almost invariably practised.

Great interest had been shown in the use of phosphated zinc coatings as a paint basis for the long-term protection of steel surfaces. Earlier emphasis was given to this in the BSI recommendations on the protection of steel surfaces against corrosion (PD 420) and further results have shown the great advantages of this double method of protection. As little as .00005 in. of specially treated zinc phosphate in a continuous process greatly improves the corrosion resistance of painted steel, the report states.

Chromate Treatment

Chromate treatment for galvanised and zinc-plated surfaces has been extended to sprayed zinc coatings, sherardised coatings, and even to the zinc films applied by the richly pigmented metallic zinc paints. These latter can be scratch-brushed to give a metallic surface which takes the chromate well. In all cases enhanced corrosion resistance results.

Non-Ferrous Scrap

Stocks of scrap metals held by the Ministry of Supply Directorate of Non-ferrous Metals, and available for disposal as at May 31, amounted to 49,783 tons. Details are as follows :—

S.A.A. cases, 5852 tons; copper and copper alloy, 11,544 tons; zinc and zinc alloy, 6672 tons; lead, 5149 tons; other grades, 20,566 tons.

In the period March-May inclusive, 17,023 tons were sold for approximately £1,450,000. During the same period, 13,871 tons (5875 lead) were put out to tender.

Engineers Visit Works.—The Institution of Mechanical Engineers, attending their annual conference in Glasgow, last week visited the works of Mirrlees Watson, and the laboratories of the Royal Technical College and Glasgow University.

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ECA Authorisations

U.S.A. and Canadian Supplies

ACCORDING to a statement from the U.S. Information Service (U.S. Embassy, London), the U.S.A. has so far been the source of supply for about 75 per cent of the commodities authorised for procurement by the U.S. Economic Co-operation Administration. By June 14, total procurement authorisations had risen to nearly $394 million. Of this total, the U.S.A. was the country of origin for commodities valued at $194,120,789, the second supplier being Canada with $60,839,511.

Metals and Chemicals

Among materials originating in the U.S.A. are coal, tinplate, zinc, sulphur, linseed oil, black iron sheets, petroleum, coke, steel products, brass, and veterinary and medical supplies. Canadian contributions include, aluminium, copper, lead, and linseed oil.

Other products are provided as follows: copra from the Philippines; coal and some potash from Poland; sesame seeds from Nicaragua and from Portuguese West Africa; whale oil from Norway; some superphate and basic slag from Belgium; and fuel oil from Saudi Arabia.

NORWEGIAN IRON-ORE

THE annual report of the A/S Sydvaranger, Kirkenes, which exploits the high-grade iron-ore deposits occurring along Norway's frontier with the U.S.S.R., contains many interesting details about the company's reconstruction and prospects. Its property in Norway's northernmost Province, Finmarken, suffered severe damage towards the end of the war as a result of the scorched earth policy carried out by the retreating German forces. Several valuable assets, however, such as the railway connecting the mines with Varangerfjord, and two water power plants with a combined power generation of 11 million kWh per annum were preserved intact.

Plans are in hand to produce 2 million metric tons of ore per year, necessitating capital investment of about 90 million crowns, which it is hoped to obtain from the Government. In addition, the company plans to issue a mortgage loan with State guarantee totalling 66.75 million crowns, of which 60 million are to be spent on reconstruction work, while the remainder is to service former loans. A further 25 million crowns are expected as a State loan.

Synthetic Iron Oxides

German Productive Methods Reviewed

PROCESSES for the production of synthetic iron oxides used by German manufacturers are discussed in a report (FB-79308) by the Office of Technical Services, Department of Commerce, Washington 25. Synthetic iron oxides were produced on a large scale in Germany, the report says. At one time the Uerdingen plant of I. G. Farbenindustrie produced 3000 tons a month of yellow and black oxides as by-products of the process for reducing nitrobenzene to aniline. Immense capital had been spent on the plant and continuous production was achieved with efficient use of labour.

Generally Orthodox

Although other firms found it difficult to compete with I. G. Farben, the Franz Rasquin firm at Cologne produced 200 tons a month of yellow and black oxides, and Kali Chemie at Berlin, 100-150 tons of red oxides. Apart from the I. G. Farben aniline process, most production methods for the yellow oxides were variations of the "seed" process. In black oxide production the investigators noted no new techniques, apart from the aniline process. Red oxides were all produced in rotary tube furnaces.

The report describes the manufacture of yellow oxides by aeration of scrap iron in the presence of copper, as at the Uerdingen plant, and the preparation of synthetic oxides of iron as by-products of the manufacture of aniline from nitrobenzene. The production of yellow and black oxides of iron made by these processes, and the manufacture of red oxides of iron are also discussed. Some of the processes used for manufacturing oxides in six other German firms are also described and several diagrams are included.

AUSTRALIAN ASSOCIATE FOR JOHNSON, MATTHEY

FOR 100 years Johnson, Matthey & Co., Ltd., Hatton Garden, London, have carried on successful business with customers in Australia, with a number of whom they have done business over 50 years and with one at least for the full course of a century. Widened interest in the products of the London company in the Commonwealth has now rendered necessary widened representation, effected by a newly formed association with Garrett & Davidson Pty., Ltd., of Sydney. The latter enjoy a high reputation in their work of refining and fabricating of precious metals, and their scope will soon widen to cover many of the other activities in which the London company is engaged.

Delaying Corrosion

Diverting Attack to Magnesium

A MODERN method of combating corrosion was recently displayed by the Dow Chemical Co. at the Petroleum Exposition in Tulsa, Oklahoma. Magnesium anodes are inserted near a pipeline, the two metals being connected by a wire. The effect is to cause the magnesium alloy to corrode instead of the pipeline. Protection is said to be afforded for one to 10 years, depending on soil and water conditions.

Underground corrosion is accentuated by natural electric charges which run along metal structures and out into the ground, the points of egression being the seat of attack. When the wire is run between the metal to be protected and the anodic magnesium, all the charge gathered by the structure to be protected runs into the magnesium, and thence into the ground, with which the two metals simulate a battery.

Most Effective Metal

Magnesium is said by the Dow Company to be three times more potent in preventing corrosion in this way than any other metal. Clay is added to the "battery" to ensure the retention of enough moisture to maintain conductivity. Underground metal structures such as pipelines, well casing and tubing, cables and underground storage tanks, can thus be protected from corrosion.

Cathodic protection (of ship hulls) was first suggested by Sir Humphrey Davey in 1823, but only within the past decade has it come into use for the preservation of underground metal structures.

An earlier application of the same principle by the Dow Chemical Co. was the use as anodes in hot water tanks of small diameter magnesium rods, which disintegrate fairly slowly and arrest the corrosion which would otherwise occur on the walls of the tank. (THE CHEMICAL AGE, March 27). The Dow Chemical Co. uses magnesium alloy anodes containing about 6 per cent aluminium and 3 per cent zinc, and the best results have been achieved in the protection of underground pipelines, and the steel flume which carries the sea-water from which bromine and magnesium are extracted.

U.S. Bauxite Production.—According to the U.S. Bureau of Mines, domestic bauxite production in the first quarter of the year totalled 304,176 long tons, an increase of 2 per cent. over the preceding quarter. Imports, including 46,351 tons from British Guiana, amounted to 581,083 long tons or 14 per cent. more than in the last three months of 1947.

New Chrome Prices

Order Effective this Week

THE Ministry of Supply announces that the following selling prices for chrome ore and concentrates, including carriage costs to the consumer's nearest rail point, will apply for material despatched as from July 1, 1948.

Refractory Grades	Per ton ex ship £ s. d.	Per ton ex store £ s. d.
Rhodesian Imperial Grade ...	9 18 6	11 1 0
Transvaal 1st grade (basis 42 per cent. : scale 1/6) ...	7 17 6	8 19 0
Indian (basis 40 per cent. : scale 1/6)	9 2 6	10 4 0
Philippine	7 13 0	8 15 0
Turkish—		
Grade I (basis 43 per cent. : scale 5/-)	11 13 0	12 15 9
Grade II (basis 38 per cent. : scale 5/- up only)	9 18 6	11 1 0
Grade III (basis 35 per cent. : scale 4/- up, 7/6 down) ...	8 15 6	9 18 0
Sierra Leone	9 12 6	10 15 0
Metallurgical Grades		
Rhodesian lumpy	10 0 0	11 2 0
Baluchistan	10 17 3	11 18 9
Rhodesian washed concentrates	10 4 0	11 9 6
Chemical Grades		
Transvaal A Grade concentrates (basis 48 per cent. : scale 2/6)	9 12 0	10 17 0
Transvaal B (basis 48 per cent. : scale 2/6)	9 6 0	10 11 0
Transvaal C (basis 46 per cent. : scale 2/6)	8 19 0	10 4 0
Transvaal D (basis 44 per cent. : scale 1/6)	7 16 0	9 1 0

STEEL ORDER AMENDED

A LIMITED relaxation of the existing regulations governing the acquisition of steel products is reflected in the Control of Iron and Steel (No. 65) Order, which came into effect last Thursday.

Under the new order, steel castings, malleable tube fittings and Gas List wrought fittings can be acquired in any quantity for home use without a licence. Licences will still be required, however, from the Iron and Steel Board for the export of these items.

In addition, the order amends the definition of tube, pipe and standard fittings, making it clear that conduit fiittings are excluded from the controlled forms of iron and steel.

Canadian Quest for Lead and Zinc.—An extensive scheme of exploitation is to be started in the Canadian Northwest Territories. In particular, the Consolidated Mining & Smelting Co., and Ventures, Ltd., intend to exploit lead and zinc ores in the region of the Great Slave Lake. These two companies have been granted a concession of 500 square miles.

Strengthening Welded Pipe Systems

Studies of Behaviour Under Stresses

A RECENT meeting of the British Welding Research Association at its Abington Hall research station, near Cambridge, afforded an opportunity for a conducted tour of the various laboratories. Introductory talks by senior investigators included work on curved tubes, the purpose of which had been to compare the behaviour of welded and seamless pipe bends. The speaker was Mr. N. Gross.

Exacting Conditions

Pipe bend problems, Mr. Gross said, had in the last decade become of increasing importance. Industrial pipe systems conveyed fluids that might be at high temperature and at high pressures. In some modern processes, pressures of 700 atm. and over were used, and, with the recent advance in production of special steels for high temperatures, process temperatures were likely to continue to go up.

It became, therefore, an increasingly difficult problem to dispose of the resulting larger expansion and contraction of the pipe line. Curved parts of the line had been the object of the attention of many engineers and mathematicians in the past, and practical considerations had recently proved the need for further research.

During the war it had appeared desirable to replace seamless imported pipe bends by the pipe bends manufactured in this country by welding. The BWRA undertook to carry out experiments under the control of Prof. J. F. Baker at Cambridge University Engineering Laboratory at Abington. Short portions of a high-pressure high-temperature pipe line, incorporating 90° seamless and pressed welded pipe bends, were tested under internal pressure and under the action of external movement such as would be caused by an axial movement of the adjacent straight pipe when it expanded.

Stresses Analysed

The bends were stress-analysed by means of brittle lacquer and electric resistance strain gauges, the latter being applied on the inside as well as on the outside surface of the bend. The change of diameter and the deflections of the bend were also recorded. The internal pressure tests were carried to destruction, while loading was applied in pressureless tests until collapse took place.

From results so far achieved, continued Mr. Gross, it was evident that when a pipe bend was under the influence of external forces tending to decrease the radius of curvature the dominant stress was transverse and located in the vicinity of what was thought in the past to be the neutral axis. That was borne out by theory and by a number of failures in service. The largest stress occurred at those points on the inside surface.

Under the action of external forces alone, and given static loading conditions, the pressed welded bend in the non-heat-treated state was found to be of equivalent strength to the seamless bend. The experiments had also shown that the load-carrying capacity of pipe bends, seamless or welded, was not exhausted when the stress in a part of the structure reached the yield point, as was assumed by using limiting stresses as a basis for design. In fact, the investigated pipe bends carried about twice the lead that produced the first permanent set, without suffering unduly large deflections. As in other mild-steel structures, the ratio (load-causing failure with working load) was greater than expected.

The Next Stage

In order to obtain further information on the behaviour of welded, as compared with seamless, pipe bends, the BWRA intended to conduct further experiments. They included investigations of pipe bends under the action of internal fluctuating pressure, under repeated applications of external loads, and under the influence of sudden increases of pressure.

Institution of Works Managers.—The Institution of Factory Managers and the Institution of Works Managers amalgamated on July 1, 1948, the name of the new body being the Institution of Works Managers. The registered office of the Institution is 67-68 Chandos Place, London, W.C.2.

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LETTERS TO THE EDITOR

One Chemist is "Sadly Disillusioned"

SIR,—Your article "Guarding the Gate," discussing the functions of the professional bodies in "an increasingly socialistic world" is timely, and many of us will feel indebted to you for raising this vitally important issue. I feel emboldened to offer a few comments from the angle of an industrial chemist.

I find that I belong to no less than six of these professional bodies and my total subscriptions amount to something like £25 a year. I am beginning to wonder why I spend all this money.

Three of these bodies are primarily concerned with research and publications. I feel I ought to support them but, on the other hand, I can always get all the information I require quite easily from libraries—I admit I am fortunate in that I work in Central London.

The Royal Institute of Chemistry and the Institution of Chemical Engineers are primarily qualifying bodies and really do very little else that benefits me directly. Again, I feel I am supporting these bodies largely for unselfish reasons.

I also joined the British Association of Chemists some years ago. It seemed to me to be trying to do something to help the lower strata of the chemical profession and its unemployment scheme and appointments service attracted me. I am afraid I have been sadly disillusioned. The leading members of the association spend most of their time in senseless disputes which they do not even have the decency to conduct in private and the main purpose of the unemployment scheme seems to be to build up colossal reserves for propaganda purposes. The only time I used the appointments service I found that I received a weekly duplicated list mostly composed of extracts from the "Situations Vacant" column of the Press.

The association itself appears to be declining in membership and although it increased the subscription a year or two back, it is in financial difficulties and constantly appealing for donations. The obvious failure of this hopeful attempt of the chemists to form a real professional trade union is to be regretted but the time has come, so far as I am concerned, to cut the loss.

If the profession of chemistry is to count for something in the brave new world of nationalisation, the TUC and tinkers' cusses, we shall have to do a lot better than this. Personally, I am seriously thinking of joining the Association of Scientific Workers—I do not agree with some of their views, but at least they are alive, strong and well-organised. I know it is said that some of its members are "unqualified." So what? We work together in the lab. and the factory. We share tables at lunch-time and buy each other pints in the evening. Why not work together in a common organisation for the good of the profession we all follow? All this fuss about being "qualified" or "unqualified" is largely snobbery. When it is taken to the extreme that it reaches in the Royal Institute of Chemistry, where an Honours Graduate who is an Associate is not considered to be sufficiently "qualified" to be a candidate for its Council, the utter absurdity of the whole business is surely obvious.

And so, although I am nearing the end of my professional career, I propose to cut loose from all the out-of-date conceptions of the older professional bodies and see if I can find some much-needed "fresh-air" in a new one.—Yours, etc.,

A SCEPTICAL CHEMIST.

(*Name and address supplied.*)

SALT DISCOVERY

A DISCOVERY that may cause Mr. Lewis Silkin, Minister of Town and Country Planning, to shelve his intention to establish a new satellite town for Manchester at Mobberley, is the salt deposit revealed by engineers of the Geological Survey at the proposed site. Three of the seven borings made so far have shown that substantial deposits exist at depths from 600-700 ft. The most recent of the borings struck salt at 650 ft., and at 675 ft. the lower extremity of the deposit has not been reached.

PRODUCTION PROBLEMS

REPRESENTATIVES of industry, universities and Government departments visited the National Physical Laboratory at Teddington last week to witness demonstrations of apparatus which will help to solve some outstanding technical problems. Sir Charles Darwin, the director, made a personal appeal to visitors to indicate lines of investigation of immediate importance to the production drive. In the metrology division an examination is being made of the principles of automatic control as applied to industrial plant.

A CHEMIST'S BOOKSHELF

Accidents in Chemical Works. (Unfaelle beim Chemischen Arbeiten). By Prof. Dr. Ernst Rüst and Dr. Alfred Ebert. Zürich, 1948. Rascher Verlag. Pp. 403. Fr.21.

The use of chemical materials has vastly increased in recent times and the possibility of accidents has necessarily also become greater. The various safety regulations to restrict such accidents, represent as a rule a guide only in general directions. This book analyses in a detailed survey the manifold accidents with which students and teachers, managers and workmen in industrial undertakings and scientists may meet. The authors identify materials and varied circumstances which may cause accidents and illustrate effective precautions by describing some 500 examples of accidents. The first chapter of the book deals with conception and definition of accidents in general, the second with the different categories of people exposed to accidents and the third outlines the possible sources of injury, subdivided into mechanical injuries, burns, and fires, poisoning, explosions, etc. A list of more than 2500 key-words helps to locate each substance or important item and a complete list of literature dealing with the subject is given. To all who are not linguistically prevented, the book will be of great use and may promote more complete safeguards. It is also to be recommended to Government and institution officials, for the light it casts on Swiss legislation, classification of poisonous materials and precau tions.

A Scheme of Qualitative Organic Analysis. By F. J. Smith and Emlyn Jones. 1948. London: Blackie & Son, Ltd. Pp. VI + 320. 17s. 6d. net.

This book can be recommended for special study and is intended, say the authors, both of whom are professors of chemistry at Technical Colleges, for the ordinary and higher national certificates in chemistry, the associateship and fellowship of the Royal Institute of Chemistry, and London B.Sc. degrees. All teachers of organic chemistry know that practice in the solution of practical exercises is a most valuable part of a student's training. The problem of the qualitative identification of organic compounds is outlined in this textbook in two alternative directions. 1. When no information is available as to the purity of the substances; and, 2. When it is known that the substance is of a fairly high degree of purity. The authors have developed a systematic scheme of examination, whereby classes of organic compounds are eliminated one by one. The textbook is divided into twelve chapters. An introductory part deals with determination of boiling and melting points, while the following chapters deal with organic compounds in eight groups according to their composition of miscellaneous elements. The eight tables are a very useful supplement, and the scope of compounds and derivatives prepared, dealt with in an appendix index, will be found to be rather wider than is usual in a students' textbook. The book seems likely to become recognised as part of the regular equipment of the organic laboratory.

Electrochemistry. (Elektrochemie). By Prof. Dr. Anton Stieger, Winterthur. Part 1. Zürich, 1947. Rascher Verlag. Pp.136 Fr.7.50.

The book deals with the theoretical fundaments of electrochemistry, which, fructified by atom physics, is recently taking new directions. The perception inaugurated by Berzelius, that electricity plays an important part in chemical structure, has arisen again in a new and embracing form. The structure and formation of ions, their regular distribution in solutions, ion-reaction, etc., can nowadays be better explained than it could 20 years ago. From these new theories of cognition resulted an important deepening of the doctrine on the solutions of electrolytes. The author presents on modern foundation first an introduction to the basic conception of electrolytic solutions, describes next the qualitative and quantitative characteristics and reactions of the ions in a simple way, and, third, represents the reciprocity between "solid ions" and their solutions graphically and numerically. The relation noticeable in electrodes between chemical and electrical condition opens wide vistas of chemistry. It is therefore of great interest to chemical research and leads the way to a further study of the classical ion theory. The book is divided into five chapters; the fundamental principles of electrochemistry, the ion-reactions and ion-statics, the electrodes, and the electro-static solution theory.

SOUTH AFRICAN FUEL AND CHEMICALS

No Synthetic Oil Supplies Before 1950

ALTHOUGH the continuance of South Africa's fuel oil imports is by no means assured, the determined effort to establish a home industry for the production of oil from coal is not likely to provide help in the immediate future.

Mr. A. S. Hersov, of the Anglo-Transvaal Consolidated Investment Corporation, which has already applied for a licence to set up a synthetic plant at Vanderbijl Park with a potential production capacity of 60 million gallons a year, recently stated that the company had already had discussions with the Liquid Fuel and Oil Industries Advisory Board and immediately the licence was issued work would begin on the plant, but no production before 1950 was likely. In Mr. Hersov's view, the production should make the Union entirely independent of imports for a number of years. Much of the equipment necessary will be fabricated in South Africa but specialised refining plant will be imported from the United States and Britain.

* * *

The corporation takes the view that the hydrogenation process is not the most economical at the present stage of development. The alternative, which appears more likely to find favour in South Africa, is the synthesis process, of which the Fischer-Tropsch was the first example. It is calculated that by this method the yield per ton of coal will be some 30 to 50 gallons of petrol and 5 to 8 gallons of diesel oil. The actual figures will depend on the nature of coal in general, but it will be possible to use high-ash coals which are otherwise unusable in South Africa, except under exceptional circumstances.

* * *

Mr. J. Mushet, South African Minister for Economic Development, said at Durban last week that one of the largest textile concerns in the world, a British firm, was likely to establish a rayon industry in Natal, with a first investment of £10 million. He also disclosed that a new deposit of coal of 250 million tons had been discovered in South Africa, but did not say where. A company plans to start producing oil from coal in 1950, with a target of 60 million gallons a year after the first two years. Trade restrictions between South Africa and other British territories in Africa were easing, Mr. Mushet said, and there were prospects of "a completely satisfactory arrangement."

* * *

Tentative plans for starting a Government sealing industry on the Prince Edward Islands next year are going forward. Government experts are satisfied that, while the market price of seal oil remains anywhere near its present level of nearly £100 a ton, sealing on the Union's new islands should be a profitable proposition. The male sea-elephants, weighing up to 5 tons, which alone will be killed, are believed to appear on the islands in thousands for a few months' stay towards the end of the year. Each should produce about £15 worth of oil. It is probable that the Government sealing factory ship, *Gamtoos*, will take a party of sealers to the islands about August next year.

* * *

Sales of margarine have dropped by more than 50 per cent in centres all over the Union since butter came into free supply. In Johannesburg 9423 lb. of margarine were distributed through the Social Welfare Department of the city council during the second week of November, 1947. The figure for the second week of April was only 4743 lb. Manufacturers of margarine are disturbed by the sales slump because they had hoped, when production began, that the demand would become constant and would not depend on butter supplies. It is felt in commercial circles that a demand for the establishment of a free market in margarine may soon be made to the Government.

* * *

Anti-bubonic plague vaccine prepared from living virulent germs has been produced at the South African Institute for Medical Research. This was disclosed by Col. E. H. Cluver, the director of the institute. Dr. Cluver said that anti-plague vaccines had in the past been prepared from killed germs, but such vaccines had only relatively poor immunising powers. A disadvantage associated with the new vaccine is its short span of life, since the organisms soon die. Experiments are being made, however, to find methods of storing living vaccines for a reasonable period.

Italy's Economic Revival

Regaining Foreign Markets

FURTHER proof of Italy's post-war industrial revival is supplied by recently released figures relating to cement, rubber and mercury production.

Much of the heavy wartime damage to the Italian rubber industry has now been repaired and several factories have recently opened again. At present 172 firms employing 44,000 workers are engaged in the manufacture of rubber articles. In the synthetic rubber field one factory, which is capable of an output of 700 tons per month and produced 13,000 tons in 1942 and 1943, has not yet been re-opened since hostilities ceased. The lack of raw materials has prevented the immediate recovery of the Italian rubber industry, but experts declare that by 1951 output will exceed the pre-war level by about 60 per cent. The recent steady production rise has permitted increased exports and during last year Italy sent out well over 3000 tons of rubber goods, chiefly to Egypt, Holland, India and Switzerland.

Soaring Italian Cement Production

The output of Portland cement in Italy is steadily increasing regardless of users' reduced demands. According to trade statistics, production figures for the first four months of this year are considerably higher than for the same periods in 1947, and the total output of 338,000 tons last month reveals a production rise of nearly 100 per cent since January. There is, however, no sign of an immediate rise in demand.

Surplus Mercury

An increase in output is also reported by Italian mercury producers and during 1947 total production was estimated at 1860 tons, which is about 80 per cent of the 1938 figure. Exports last year amounted to 690 tons, compared with the pre-war average of 1500 tons.

Manufacturers are a little worried, however, at the rapid piling up of stocks, which in March this year rose to 28,000 tons or about four times as much as Italy can hope to export before the end of 1948. The decline in domestic consumption has lowered prices, and experts assert that, should the situation fail to improve, output may possibly have to be reduced.

Tannic Extracts

One industry which has, however, been unable to regain its pre-war status is the production of tannic extracts. There are 37 factories in Italy engaged in this branch of industry and before the war they produced about 40,000 tons a year, of which 20,000 tons were purchased by Germany, while other good customers were Bulgaria, Hungary and Rumania. All these markets have now disappeared, and despite orders from England, exports are small and the industry is not likely to expand until the German market is re-opened. In the meantime output is fixed at some 15,000 tons a year, although equipment available would permit an annual production of 60,000 tons.

(*Continued at foot of next column*)

Rising Totals

Output from Italian chemical industry (expressed as percentages of 1938 production) during the first quarter of the current year was as follows: January, 63.7 per cent; February, 66.8 per cent; and March, 75.4 per cent. In connection with the ECA scheme, Italy will receive nitrates from Chile to a value of $2-3 million. Output of bergamot essence is expected this year to amount to 165,000 kg. This would compare with 159,000 kg. in 1946 and 138,000 kg. last year.

Progress by Montecatini

Growing Resources and New Patents

FURTHER evidence that the Montecatini concern, Milan—Italy's leading chemical and mining organisation—is rapidly regaining the pre-eminence it enjoyed in pre-war years, is afforded by the annual report for 1947.

Employment rose from 4000 to 54,000, plants operated now number 150 (there were only 76 at the end of 1945), and the nominial value of products delivered was 60 milliard lire against 21 milliard lire in 1946. Net profit rose from 516.9 to 1630.6 million lire, and a dividend of 12 per cent has been paid.

Widening Contacts

Special importance is attached in the report to an intensification of the links with various foreign chemical and mining groups, for instance, to the acquisition of the Geigy patents for the manufacture of DDT and to special agreements with leading U.S. chemical manufacturers.

The arrangement whereby Du Pont de Nemours' nylon patents are exchanged for the Montecatini patents in the field of nitrogen chemicals is regarded as being of special significance. It is also believed that the group will play an important rôle in Marshall-plan arrangements, particularly in the production and distribution of chemical fertilisers.

Private Enterprise in Poland

1600 Small Chemical Plants

DATA to indicate the scale on which privately operated chemical industries continue to function in Poland were released last week by the Polish Embassy in London.

According to this statement, production of the privately owned chemical factories in Poland is an important supplement of the output of the State-owned chemical industry. The total number of private factories exceeds 1600, mostly small enterprises employing from a few to some scores of workers. The total employment in these factories does not exceed 12,000. The value of their production has been estimated at from 12 to 13,000 million zlote in 1947.

The privately owned chemical industry is organised in eleven associations, corresponding to regions where chambers of trade are active. These associations are represented by the Union of Private Chemical Factories whose charter has been approved by the Ministry of Industry and Trade.

Eight Groups

The factories, says the Polish statement, fall roughly into the following groups:—1. 380 soap and washing powder factories with 2400 workers. The value of the 1947 output was about 3500 million zlote. 2. 125 varnish and paint factories with 1400 workers. Value of 1947 production, 2400 million zlote. 3. Pharmaceutical factories. Production value in 1947 from 1500 to 2000 million zlote. 4. 143 cosmetics factories with over 1000 workers. Value of production in 1947, about 1600 million zlote. 5. 88 factories of shoe and floor polish, candles and other household articles giving employment to about 1600 workers, with a yearly production value of 1600 million zlote. 6. 164 plastic factories—employment 1060, yearly production value about 900 million zlote. 7. 14 factories of timber by-products, turpentine, colophony, charcoal, with 260 workers and production value of 50,000 zlote. 8. 300 enterprises producing various chemical articles, employing 3600 workers. Joint yearly production value of 1800 million zlote.

Minerals in Lower Silesia.—A deposit of quartzsand is being mined at Szczeblow, Lower Silesia. At nearby Sobotka, magnesite is being mined at a monthly rate of about 1800 tons, and gypsum at 12,000 tons yearly. Prospectors are searching for china clay of which worth-while deposits are thought to exist in the Swidnica district. Kaolin is at present imported from Czechoslovakia.

D

Indian Chemical Projects

Developing Salt and Ferrous Metals

A THREE-year development plan for the salt industry in Bengal, designed to increase production to 5,600,000 maunds per annum, has been drawn up by the Government of West Bengal and is now receiving the attention of a specially constituted Salt Experts' Commission.

The scheme proposes the development of the salt producing centres in Midnapore District and the Sundarabans, covering about 10,000 acres. In order to assess development possibilities the commission has visited several sites, including Purushottampur, a seaside village in Midnapore, where salt is manufactured both by the sun-drying and pan-boiling processes.

The final recommendations of the experts will not be available until additional data connected with the whole of the Indian salt industry have been examined

Protective Tariffs

The Indian ferro-silicon and steel belt lacing industries are also receiving close Government attention in view of the recent recommendations of the Tariff Board that the existing revenue duties of 18¾ per cent in the ferro-silicon industry and 10 per cent in the steel-belt-lacing trade should be converted into protective duties at the same rates. The Government has agreed with this proposal as far as the ferro-silicon industry is concerned.

Proposals for Madras

Measures for the stimulation of the chemical industry in Madras are also under discussion as a result of a report prepared by the Industrial Planning Committee appointed by the Government last year.

The committee recommends the establishment of a sulphuric acid plant, the installation of electrolytic alkali equipment, the immediate development and expansion of the soap, shark oil and cotton seed oil industries and the setting up of new plant for the production of vitamins and yeast.

The report also recommends the use of molasses for the production of power alcohol and urges that the use of edible oils in soap production should be avoided.

Oil from the Sea Bed.—Oil wells beneath the sea in the Gulf of Mexico are stated to be capable of producing 25,000 barrels a day within the next five years. Oil has been obtained from shallow-water sinkings for about 10 years; now the Humble Oil & Refining Company is pumping from a well eight miles out at sea. Equipping it cost $1.2 million.

American Chemical Notebook

From Our New York Correspondent

THE U.S. Atomic Energy Commission has announced that it will establish, at a cost of more than $1 million, a special laboratory at New Brunswick, New Jersey, for the chemicals and special materials used in the national atomic energy programme. This will provide precise analytical quality control of special materials used in atomic energy, and control of materials processed in plants under the Commission's New York office. Operation of the new installation is expected to begin in the autumn. The plant, which will be the third major atomic energy research project in the New York metropolitan area, will employ a staff of 65 scientists and technicians.

* * *

The problem of converting solar energy into fuel has been reviewed in General Motors research laboratories, according to Mr. C. F. Kettering, vice-president and director of research. He said the most difficult part of the problem was now over because "the hardest part of the job is always the problem of blocking out the correct research methods." Successful completion of the research would lead to the synthetic production of fuels comparable to oil and coal. A key to the final solution is chlorophyl which G.M. laboratories have been studying for more than twelve years. This material had long been recognised as the only substance in nature possessing the unique power of rapidly "stockpiling" solar energy in the form of usable resources, Mr. Kettering said. If the natural process could be reproduced artificially, an almost limitless resource of energy would be placed within reach. The discovery had been evaluated by scientists as "equal in importance to the discovery of nuclear fission."

* * *

Higher production and shipping costs have necessitated an increase of one-half cent per pound in the price of titanium dioxide pigments and a quarter of a cent for titanium calcium pigment, the Du Pont Company has announced. The basic price of the anatase grades of these pigments will be 18 cents per pound, the 1931 selling price. Rutile grades of titanium dioxide were not produced at that time.

* * *

The Manufacturing Chemists' Association of the United States has recently published Chemical Safety Data Sheet SD-22 on methanol, the twenty-second in the series of chemical product safety manuals being prepared by the organisation. Designed for supervisory staffs and management, the new manual contains essential information for the safe handling and use of methanol and covers physical and chemical properties of the product, recommended shipping containers and handling methods, personal protective equipment, and health hazards and their control. Copies of the new manual (20 cents) are available from the Association's office at 608 Woodward Building, Washington 5, D.C.

* * *

According to the U.S. Bureau of Mines, native sulphur production last April was 18 per cent greater than a year ago and the total shipments from the mines—481,684 tons—was only surpassed in November, 1947, when 504,257 tons were shipped. Stocks at the end of the month had decreased by 32,689 since January 1 this year and were 6 per cent lower than in April, 1947.

ELECTRONIC COUNTER

AN ingenious machine for the counting and batching of small objects of similar size, such as tablets, pills, buttons, sweets, nuts, bolts, beads, etc., has been designed and manufactured by C. E. King & Sons, Ltd., of Staines, Middlesex, with the co-operation of the Mullard Technical Advisory Service.

The machine consists of a metal hopper of about 14 in. diameter and 6 in. deep, with a metal disc, fitting closely to the inside base, the rim just clearing the side of the hopper. Near the periphery of this disc two rows of holes, inner and outer, have been drilled large enough to collect and pass singly the objects to be counted. When a new batch of objects of very different size is to be counted, the disc can be rapidly replaced by one carrying holes of the required size.

The disc in the base of the hopper revolves, carrying the objects, *e.g.*, tablets, with it. Flat brushes, set at an angle between the centre and the side of the hopper continuously sweep the tablets into the holes near the edge of the disc, where they remain until they have been carried to a point where the holes pass over the mouths of a pair of chutes, into which the tablets drop. In dropping through a chute, the tablets pass a photocell and fall into a container. When the predetermined quantity of tablets have fallen past the photocell, a flap is automatically moved to divert the stream into another container. The photocells used are Mullard Type 90 C.V.

Technical Publications

ONE answer to the scepticism which may be felt regarding India's capacity to carry into effect the extremely wide-ranging plans for industrial and chemical development is contained in the booklet "Sixty Years—the Story of Tatas," issued by Tata Industries, Ltd., the group which efficiently controls a large proportion of all the subcontinent's modern industries, of many of which it was the founder. This describes and illustrates a chain of events set in motion 60 years ago by a young student of Elphinstone College, Bombay, Jamshedi Nusserwanji Tata, and some of its impressive results in the present, a long list of key undertakings producing chemicals, metals, machinery, textiles, oil, cement, locomotives, and aircraft and providing a number of essential services. Tata Chemicals, established on the eve of the war in Baroda, is to-day the essential support of much of India's industrial production and is nearing the stage where it will be able to supply half of India's total requirements of soda ash and heavy chemicals of the same class.

* * *

The May (No. 4) edition of *The Aluminium Courier*, published by the Aluminium Development Association is almost entirely devoted to the wide and growing use of aluminium alloys in passenger road transport, where strength, shock resistance and good behaviour under corrosive conditions are of prime importance.

* * *

The International Nickel Company, Inc., New York, associate of the Mond Nickel Co., Ltd., London, has catalogued in "Helpful Publications on Nickel Alloys" a list of all its periodicals, guides and pamphlets, numbering nearly 100, on uses and properties of nickel in various industrial fields. They are supplied free of charge.

* * *

The "Zinc Bulletin" of the Zinc Corporation and other zinc interests covers in its 12 pp. Spring issue nearly all the main uses of zinc and announces publication of two new booklets: "How Hot-dip Galvanising Defeats Rust" and "Some Details of Zinc Roll Cap Roofing for Plumbers and Sheet Metal Workers."

* * *

Equipment for the accurate measurement of time in applications where a high time stability is essential, is discussed authoritatively by Mr. H. M. Smith and Mr. J. Bell in *Technique*, April, a quarterly journal devoted to instrument engineering.

A quick make-and-break switch suitable for "building-in" has been produced by Brookhurst Switchgear, Ltd, Chester. The "Isofuse," for which patents are pending, is the subject of an illustrated pamphlet showing its application to certain metal-working machinery. It is stated that the design is such that it is impossible: (1) to withdraw the fuse carrier unless the switch is in the "off" position; (2) to make contact inadvertently between the fixed and moving metal parts during withdrawal; and (3) to replace the moving contact portion incorrectly.

* * *

"Textile Applications of the Glycol Fatty Acid Esters" is the title of a reprint now available from the Glyco Products Co., Inc., Brooklyn, N.Y. This describes the new class of surface-active agents, useful as wetting agents, emulsifiers, softeners and lubricants. They are of particular interest because they are non-ionic. The higher members (polyglycol esters) are soluble in water, hydrocarbons and oils and range in consistency from liquids to waxes. A chart giving the chemical composition and physical properties of these esters is included.

* * *

"The Advancement of Science," Vol. V, No. 17, April, includes a report of a discussion arranged by the Chemistry Section at the Dundee meeting last year of the British Association for the Advancement of Science. Other articles include "Operational Research" by Prof. P. M. S. Blackett; and "Supply and Utilisation of Coal," nine papers on the future of coal supplies contributed at the Dundee meeting. Several eminent scientists contributed to a conference at Manchester University in May, 1947, entitled "The Place of Universities in the Community." The two sessions are fully reported. Publishers: The British Association, Burlington House, W.1, price 6s.

* * *

Three papers recently read before a section of the Royal Institute of Chemistry, have been printed in the form of booklets. Their titles: "The Fertilisers and Feeding Stuffs Act, and Some Analytical Implications" by Geo. Taylor; "Some Applications of Acetylenic Compounds in Organic Synthesis" by A. W. Johnson and "Chemical Cyphering—A Universal Code as an Aid to Chemical Systematics" by M. Gordon, C. E. Kendell, and W. H. T. Davison. Copies are obtainable from the Institute, 30 Russell Square, W.C.1.

Home News Items

Nitrogen Forecast.—Nitrogen requirements can be expected to increase at an annual rate of not less than 7 per cent during the next five years, states the half-yearly report of Messrs. Aikman (London), Ltd.

Flint Coal Project.—A plan to revive the coalmining industry in the once thriving colliery district of Leeswood and Treuddyn, in Flintshire, has been deferred by the National Coal Board.

Dunlop's Gift to Safety Campaign.—The Dunlop Rubber Company has contributed £500 to the fund opened by the Royal Society for the Prevention of Accidents for a permanent training centre and road safety exhibition at Hyde Park Corner.

Abatement Enforced.—An order to abate a smoke nuisance was made last week against White, Hudson & Co., manufacturing confectioners, Southport, and the firm was ordered to pay £7 9s. costs. Mr. A. V. Cunliffe, for the firm, said chimney alterations had already cost nearly £450.

Courtauld Mission for Australia.—Courtaulds, Ltd. announces that a technical mission will shortly go to Australia to investigate the possibility of building a plant there to produce rayon. An earlier mission, which went there last October, encountered difficulties which called for further consultation here.

Disposal of Drugs.—The Association of British Chemical Manufacturers states that the name of J. F. Macfarlan & Company should be added to the list of firms supporting the association's recent announcement regarding the disposal of Government surplus stores of pharmaceutical products without safeguard as to quality. (THE CHEMICAL AGE, June 5).

No Dufay-Chromex-I.C.I. Agreement.—Attempts to formulate an agreement between Dufay-Chromex, the colour photography specialists and proprietors of Polyphoto and Cornet cameras, and I.C.I., Ltd., have not been successful. It was announced last week that after protracted negotiations "no practical plan could be evolved whereby a mutually satisfactory agreement could be entered into," but the Dufay directors "look forward to the closest co-operation" in the future. Though Dufay made a loss of £14,222 instead of £58,107 profit, there are net current assets of £561,155, including £418,365 cash.

BoT Plastics Section.—The Plastics Materials Section of the Raw Materials Department of the Board of Trade has removed to I.C. House, Millbank, London, S.W.1.

ROP Loses Glasgow Oil Contract.—Glasgow Corporation will in future buy petrol and diesel oil from Scottish Oils and Shell Mex instead of from Russian Oil Products, the pre-war contractors. The current ROP contract expired at the end of June.

Steel Production Interrupted.—Production at the Clydesdale Steel Works, Mossend, Lanarkshire, will fall by some 900 tons a week, pending the restoration of the roof of one of the furnaces which collapsed last week. Repairs will take several weeks.

£750,000 for British Machinery.—An order worth more than £750,000 for plant to produce continuous filament rayon yarn has been secured by Dobson & Barlow, Ltd., of Bolton, a constituent firm in the combine of Textile Machinery Makers, Ltd.

Fall in Coal Output.—Last week's coal output was the lowest since May 8, except for the Whitsun period. Total production was 4,181,900 tons against 4,187,500 tons the previous week. Miners are, however, still exceeding the weekly average of 4,058,000 tons required to reach the year's target.

Non-Skid Tyre.—The Dunlop Rubber Company announced last week that, as steel becomes available for moulds, it will put into full production a new pattern tyre introducing further advances in non-skid qualities and, where desirable, capacity to disperse static electrical charges.

New British Standards.—Two new specifications dealing with methods for the sampling and analysis of Rennet casein and acid casein, serial numbers B.S.1416 and 1417 respectively, have recently been issued by the British Standards Institution. These can be obtained, price 2s. 6d. each, from the sales department at 24 Victoria Street, London, S.W.1.

Change of Address.—Associated Lead Manufacturers, Ltd., announces that the address of its London sales office, transport, invoicing, accounts and general departments has now changed to: Ibex House, Minories, London, E.C.3 (Tel. ROYal 4525). The purchasing and solder and alloys sales offices remain at 14 Finsbury Circus, London, E.C.2.

PERSONAL

MR. J. R. L. GALE has been appointed a director of Key Glassworks, Ltd.

MR. H. N. LEVESON-GOWER has resigned from the board of Dufay-Chromex, Ltd.

MR. LEONARD B. JONES, of Brandlesholme Road, Bury, a director of Eton Mills Dyeing & Finishing Co., Radcliffe, who was Mayor of Bury, 1943-44, left £11,599, net £11,102.

MR. JAMES H. DONCASTER, of Sheffield, for many years chairman of Daniel Doncaster & Sons, Ltd., and of the High Speed Steel Association, left £74,834.

SIR ANDREW M'CANCE, Glasgow, president of the Iron and Steel Institute, received the degree of Doctor of Laws at a Commemoration Day graduation at Glasgow University last week.

DR. STANLEY PEAT, Reader in Chemistry at the University of Birmingham, has been appointed to the Chair of Chemistry at the University College of North Wales, in succession to PROF. E. D. HUGHES.

DR. JULIAN HUXLEY, British scientist and director-general of Unesco, has been elected a corresponding member of the anatomy and zoology section of the Academie des Sciences in Paris.

PROFS. NIKOLAI GAVAILOV and NIKOLAI ZELINSKY, members of the Russian Academy of Sciences, have been awarded 1947 Stalin prizes for science in recognition of their work on the chemistry of protein.

DR. L. H. COHAN, director of the New York Research Laboratory of the Witco Chemical Company, is at present in London and plans to return home on the *Queen Mary* early in July.

MR. THOMAS WOODFORD SMITH, of Canadian Industries, Ltd., was elected to succeed DR. P. E. GAGNON as president of the Chemical Institute of Canada at the annual meeting on June 7. DR. E. W. R. STEACIE, of the National Research Council, Ottawa, was named vice-president.

LIEUT.-GEN. SIR KENNETH M. LOCH, one of the Scrap Investigation Committee set up by the Ministry of Supply earlier this year, has been appointed to the staff of the Control Commission in Germany to co-ordinate the collection of scrap iron and steel for use in the U.K.

MR. G. E. BEHARRELL, the Dunlop Rubber Company's managing director and president of the Tyre Manufacturers' Conference, has been elected president of the Federation of British Rubber Manufacturers' Associations.

GEN. SIR READE GODWIN-AUSTIN, chairman of the South-Western Division of the National Coal Board, who was due to retire on reaching the age of 60 in April, 1949, has asked to be relieved of his duties with effect from August 1 this year.

Recent additions to the board of directors of W. T. Copeland & Sons, Ltd., Stoke-on-Trent, are MESSRS. SPENCER COPELAND, JOHN COPELAND and GORDON HEWITT, all of whom are under 30 and have played an active part in the affairs of the company since their demobilisation from the Army.

On the recommendation of the Tyre Manufacturers' Conference, MR. F. G. W. KING, technical director of the Dunlop Rubber Company at Fort Dunlop, has been appointed a governor of the National College of Rubber Technology, newly established by the Minister of Education at the Northern Polytechnic, London. Other governors appointed include MR. H. WILLSHAW, chief engineer, and MR. C. D. LAW, Dunlop's chief staff training and appointments officer.

OBITUARY

MR. PETER CALDWELL, analytical chemist at the West of Scotland Agricultural College for more than 40 years, has died at his home, 47 Whitletts Road, Ayr. Mr. Caldwell, who was 80, retired 12 years ago.

MR. J. T. HACKETT, chairman of J. T. Hackett & Co., manufacturing chemists, of Vauxhall Road, Liverpool, and a former Mayor of Bootle, has died at Greasby, Cheshire. He was 79.

Mineral Development Committee.—Questioned on the progress of the Minerals Development Committee, Mr. H. T. Gaitskell said it had had 11 meetings, and its technical and economic sub-committees 23 and 11 respectively. A Scottish sub-committee had met eight times. Members of the committee had made nine visits to mines and mining districts. The committee still had considerable evidence to collect, and it was likely to be some months before its report would be ready.

Overseas News Items

Siam to Export Tin Freely.—Tin ore exports from Siam, hitherto shipped only to those countries authorised by the Washington Combined Tin Committee, may now be despatched freely to any country. The Soviet Government is reported already to have offered to buy unlimited quantities.

Polish Coal Exports.—A report from official sources in Warsaw claims that Poland is now the largest coal exporter in Europe, sending coal to 22 countries, and in the world market ranks second to the U.S.A. During the first quarter of this year exports totalled 5,799,000 tons.

Lever Bros. U.S. Deal.—Lever Bros. Co., the Lever Bros. U.S. subsidiary, has announced the purchase of the John F. Jelke Co., Chicago, one of the largest U.S. manufacturers of margarine. No purchase price has been disclosed. The annual sales of the Jelke concern are said to amount to about $25 million.

Egyptian Rayon Plant.—A modern rayon plant being built near Alexandria by a U.S. firm, Oscar Kohorn & Co., Ltd., for the Société Misr pour le Rayonne, S.A.E., is nearing completion. Annual output from the works is expected to reach five million tons each of filament and staple fibre and a million tons of transparent cellulose sheets.

Control of Cattle Disease.—To combat rinderpest disease in cattle, which has long been a major scourge in Asia and Central Africa, chemists in a Nanking laboratory, working under the guidance of a research expert of UNO's Food and Agriculture Organisation, are producing small quantities of a new rinderpest vaccine developed during the war.

600-Year-Old Mine.—Sweden's Falun copper mine, probably the oldest industrial enterprise of its kind in the world, recently celebrated its 600th anniversary. Operations started under royal charter in 1347, but existing records date back to 1288. The mining of copper ceased in 1921, although considerable quantities of pyrites are still being quarried.

Veterinary Medicines Control.—The decision of the Eire Minister for Agriculture to introduce legislation enabling him to control patent remedies for livestock diseases is expected to prevent the importation of "quack" medicines. Under the Bill now pending a clear description of their contents will be required of imported animal medicines and proof of the efficacy of medicines manufactured in Eire will be required.

New Fertiliser Plant.—Operations are expected to begin this month at Ecuador's new fertiliser plant located at La Libertad, near Salinas, which was constructed in 1947 under authority of the Ecuadoran Minister of Economy and will use guano deposits from the island of El Pelado and phosphate rock from the Santa Elena deposits.

Swedish Iron-Ore Exports.—Swedish iron ore exports this year are expected to reach a total of 10 million tons compared with 8½ million tons last year. A Government proposal—if approved by the Riksdag—will permit the Swedish iron ore companies to mine 12.2 million tons of ore per annum over the next two years.

Synthetic Wood.—A report from Germany states that a process for the production of artificial wood from peat has been developed in Hamburg. Under tests a board made from this synthetic wood supported greater loads than an oak plank of similar dimensions. Successful experiments in this direction, utilising Scottish peat have already been conducted in Britain.

U.S. Employment Figures.—The total number of employed persons in the U.S.A. during early May was 58,500,000, reports the Department of Commerce. This represents an increase of more than 300,000 on the preceding month. Alternatively the number of unemployed persons dropped by 400,000 during the same period bringing unemployment to the low level prevailing last autumn.

AIR CHARTER PLAN

TO facilitate the despatch of goods by air for delivery overseas in accordance with predetermined agreements on recognised terms and conditions is the aim of the Air Freight Advisory Committee and the British Air Charter Association embodied in the drawing up of an Air Freight Charter Party.

An instance of progress already made in this direction is the inauguration of the Baltic Air Freight Market, which is engaged in finding cargoes for aircraft which might otherwise fly one way empty. One of this concern's major tasks is to acquaint potential shippers of the facilities available, and to educate them in the advantages that air transport has to offer in speed of delivery, lighter packing requirements and insurance rates. The Air Freight Advisory Committee operate from St. Mary Axe, London, E.C.3.

Scientific Glassware

Good Prospect for Scottish Industry

A NATIONAL shortage of glass blowers is handicapping attempts to establish and develop the scientific glassware industry in Scotland, although everything possible is being done to attract recruits.

Despite this shortage of skilled labour a nucleus of designers and technicians, working with experienced blowers, has been created by a new firm, the Scottish Research Company, Glasgow, which is specialising in the production of electronic and scientific glassware for both research and industry. Apparatus is being made for specified purposes and mass production work on standard lines is not being undertaken.

If the labour shortage is overcome there would appear to be good prospects of developing the industry in Scotland, in view of the growing local demands for scientific glassware from universities, technical colleges and industrial organisations.

NEXT WEEK'S EVENTS

MONDAY, JULY 5 to FRIDAY, JULY 9

Irish Chemical Association. Department of Chemistry, University College, Dublin. Summer school in chemistry. Dr. V. C. Barry: "Some Recent Advances in Chemotherapy"; Prof. W. Cocker: "Recent Advances in the Determination of the Structure of Organic Compounds"; Prof. E. J. Conway: "Recent Advances in Biochemistry"; Prof. T. S. Wheeler: "The Electronic Theory in Chemistry."

TUESDAY, JULY 6

Society of Chemical Industry (Plastics Group). Manson House, 26 Portland Place, London, W.1, 6.30 p.m. 16th annual general meeting. Dr. Emil Ott: "The Relation of Physical Characteristics and Chemical Structure of Cellulose Derivatives."

Scottish Diatomite

Diatomite mining in Scotland is to be revived, and arrangements are being made to exploit the very considerable deposits in Skye. Roads and houses are being constructed, and plans for the erection of new plant are well under way. Preliminary development may continue until the late summer, but some production is anticipated by September. Full production is expected in 1949. The development is being undertaken by a newly formed company with £25,000 share capital, Scottish Diatomite, Ltd.

British Guiana Bauxite

Encouragement of Private Investment

ONE of the most important features of a recently prepared eight-year survey designed to develop British Guiana's bauxite resources is the assurance given that no impediments will be put in the way of private mining companies, and every assistance will be afforded such companies by the Government.

At present, a royalty of 2 cents per long ton is levied on ore mined from new concessions, and processed in the Colony, while 25 cents per ton is collected on ore exported in the raw state. The decision of the Government to encourage private mining is said to be due to its inability to afford the costly and often unremunerative investigations necessary before new open-cast mines can be worked.

Concession to U.S. Firms

The Colony's chief exporter of bauxite is the Demara Bauxite Co., Ltd., a subsidiary of the Canadian company, Aluminium, Ltd. Recently, however, two American firms, the Reynolds Metal Corporation and the Permanent Metals Corporation, the latter a subsidiary of the Henry Kaiser Corporation, have been granted permission to explore for bauxite in the Essequibo ditrict.

The importance of the industry to British Guiana's economy is reflected in the fact that in 1946 exports of this mineral amounted to over $6 million out of the Colony's total export trade of approximately $26 million.

As another incentive to outside investment representatives of British and Dutch Guiana are considering reductions of the present rates of taxation on production.

RAYON FROM BEECH PULP

A REPORT in the Canadian Government journal *Foreign Trade*, May 22, announces the development of a process for manufacturing "high-tenacity" rayon from beechwood pulp, which effected a saving of approximately $1½ million in imports this year. The rayon is used as fibre in rubber tyres, and is superior to the cotton thread at present used in the combined bizones.

Present production capacity is about 500 tons of the new pulp per month, which is only slightly less than the 1948 production targets. Coal requirements for the process are described as not excessive. Valuable by-products such as yeast and alcohol are obtained from the pulp.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

GEORGE ROYSTON & SON, LTD., Barnsley, chemical engineers. (M., 3/7/48). June 1, deb. to Yorkshire Penny Bank, Ltd., securing all moneys due or to become due to the Bank; general charge. *£4,000. May 8, 1948.

TIVIDALE SHEET METAL CO., LTD., Oldbury. (M., 3/7/48). May 26, further charge securing to Mrs. L. K. Knowles, Birmingham. £1790 inclusive of £1089 19s. secured by a deb. dated July 25, 1947; general charge.

J. C. THOMPSON & CO. (DURON), LTD., Bradford, manufacturers of textile chemicals. (M., 3/7/48). May 21, mortgage to Bradford Permanent Building Society, securing £2,500 and any re-advances of sums repaid; charged on Duron Works, 1 & 3 Drummond Road, Bradford. *£3000. October 16, 1947.

GAN KEE RUBBER ESTATE, LTD., London, E.C. (M., 3/7/48). May 31, two charges and loan agreement securing to Industrial Rehabilitation Finance Board, Kuala Lumpur, Malaya, all sums which the charges may be called upon to pay under or by reason of a guarantee; charged on company's land at Tampin, Negri Sembilan, known as Gan Kee Estate. *——. April 22, 1948.

Receivership

STILVO, LTD., chemical manufacturers, etc., 63 Broad Street Avenue, London, E.C.2. (R., 3/7/48). Samuel Kershen, Ling House, Dominion Street, E.C.2, ceased to act as receiver and manager on June 4, 1948.

Company Winding Up

Advanced Chemical Industries, Ltd., Liverpool (C.W.U. 4.7.48). An order for the company to be wound up was made at Liverpool by Judge A. T. Crossthwaite, on the petition of the Countess of Londesborough, of Westonbirt, near Tetbury.

Company News

Virol, Ltd. has recorded a net profit of £50,022 for the year just ended, as against £46,553 in the previous year. A dividend of 17½ per cent on the ordinary shares has been recommended.

Stream-line Filters, Ltd. has recorded a net trading profit for the year ended December 31, 1947, of £23,648. A final dividend of 7½ per cent is recommended, making 12½ per cent for the year.

Yorkshire Dyeware and Chemical Co. has declared a net profit to March 31 of £108,176 compared with £67,123 for the preceding 12 months. Dividend on the £250,000 capital is maintained at 17½ per cent, with a final payment of 12½ per cent. Research expenditure provision is again £10,000.

Low Temperature Carbonisation, Ltd. reports a trading profit (in respect of the parent company and four of its subsidiaries) of £377,312 (£267,113) for the year ended March 31. The dividend on the ordinary shares remains at 10 per cent. A proposal before the annual general meeting of the company concerned the adoption of a new title—"Coalite & Chemical Products Co., Ltd."

Follsain Metals, Ltd. has received permission from Mr. Justice Wynn-Parry (Chancery Division) to reduce its capital from £200,000 to £94,032 16s. 11d. by reducing the nominal value of the 196,560 issue preference shares from 10s. to 3s., and the 811,007 issued ordinary shares from 1s. to 1d. Mr. J. B. Lindon, counsel for the company, said last year's net profit was £10,137, and affirmed that its business was on the up-grade. The capital reduction was to put the company on a dividend-paying basis.

Chemical and Allied Stocks and Shares

AS expected, stock markets were depressed earlier in the week by the dock strike and Berlin news, and values in all sections lost ground. British Funds, after their recent rise, came back sharply, although the result of the Birmingham cash and conversion loan created a good impression and the New Zealand conversion operation accords with expectations. There was no very heavy selling, but, on the other hand, absence of buyers was again a factor making jobbers mark down prices as a precautionary measure. Later, the lower prices attracted buyers.

Imperial Chemical, following their recent reaction, have been a relatively steady feature around 47s. (after 46s. 7½d.) awaiting terms of the pending big share issue. Laporte Chemicals 5s. ordinary again changed hands actively at a shade over 20s., Monsanto Chemicals were 57s. 6d., Fisons

57s., and Albright & Wilson 5s. shares transferred around 29s. 6d. British Glues & Chemicals 4s. ordinary receded to 19s. although the market continues to take the view that profits are still running at a higher level and that the 25 per cent dividend will be maintained, on which basis the yield at the current price is fully 5⅛ per cent.

Elsewhere, British Aluminium moved back to 48s. 6d., British Oxygen were steady at 99s. 4½d., United Molasses 47s. 9d., and the units of the Distillers Co. 26s. 3d. In other directions, Borax Consolidated deferred lost ground at 58s. 9d., and Turner & Newall were 75s. 1½d. Amalgamated Metal at 19s. 4½d. have been unaffected by the chairman's references to the dangers of Government bulk buying and the refusal to re-open the London Metal Exchange. Dunlop Rubber came back to 69s. 6d., Glaxo Laboratories were lower at £16, and British Drug Houses 5s. ordinary again around 8s., and Beechams deferred easier at 17s. 7½d. pending the dividend announcement.

Iron and steels moved moderately lower, buyers holding off owing to prevailing market conditions and rumours that the text of the steel nationalisation Bill may be issued before the end of July. United Steel were 27s. 6d., Dorman Long 29s. 3d., Colvilles 34s., while Stewarts & Lloyds declined to 51s. 10½d. with the general trend, and Tube Investments were £5⅞. Babcock & Wilcox went back to 66s. 3d., although the record profits and unchanged 15 per cent dividend helped Richard Thomas & Baldwins, the 6s. 8d. shares remaining steady at 13s. 9d.

Guest Keen were lowered to 45s. with the general trend, and Allied Ironfounders to 59s. Staveley Coal & Iron at 73s. 6d receded, although the capital repayment announced recently by Doncaster Amalgamated Collieries, in which the company is a big shareholder, has led to market talk that Staveley may also make a return of capital in due course. On the other hand, it is pointed out in the market, that Staveley is following the policy of increasing its chemical interests and that additional finance arising from coal and steel nationalisation developments, etc., may very well be retained for expansion in the chemical sphere.

Courtaulds at 37s. 6d. moved lower with the ruling trend of markets, but later rallied to 38s. It is expected the imminent annual report will show a very strong position. It is realised, however, that large financial resources are required for the big expansion and plant developments scheduled over the next few years. British Celanese receded to 19s. 3d. and were later 20s. 3d. In this case the market feels that sooner or later more capital will have to be raised.

Boots Drug at 49s. remained under the influence of the full results, Sangers were steady around 33s., with British Xylonite back to £5¼, De La Rue 42s. 6d., and British Industrial Plastics 2s. shares around 6s. 9d. Oils were unable to move against market conditions, Anglo-Iranians being 8¼, Shell 76s. 10½d., and Trinidad Leaseholds 30s. 6d. As in other sections, however, there was some recovery from the set-back shown earlier in the week.

British Chemical Prices

Market Reports

CONDITIONS in the industrial chemicals market have remained practically unchanged during the past week and a steady demand from home consumers has continued. Delivery specifications have covered good dimensions, while new business has possibly diminished slightly, owing to seasonal influences. Export inquiry, however, persists at a high level. The price position remains steady and a firm undertone is reported. Activity in the coal-tar products market continues to be influenced by the supply position and most available parcels are quickly taken up. It is reported that maximum prices will replace fixed prices for benzol and allied products and an amending order will be made shortly.

MANCHESTER.—The full range of alkali products, including caustic and soda ash, as well as almost all other descriptions of heavy chemicals, has met with a steady inquiry on the Manchester market during the past week, and, in spite of the seasonal effects of holidays, a fair amount of new buying on home trade account has been reported. This has included the ammonia and magnesia compounds and a wide range of miscellaneous chemicals. Additional export inquiry has also been in the market. Quiet business only is now being done in the general run of fertiliser materials. In the tar products section, however, there is steady pressure for supplies in both the light and heavy classes.

GLASGOW.—In the Scottish chemical market during the past week conditions have reproduced fairly closely the pattern of previous weeks, and business has been quieter than expected. Solvents, particularly amyl acetate have been in slightly heavier demand than usual. There is also heavy demand for naphthalene, but supplies are extremely limited. In the export market, the main requirement has been for bleaching powder, and there is very little of this material available. A few orders in the general field have been booked, but inquiries have not been abundant.

Patent Processes in Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of specifications accepted will be obtainable, as soon as printing arrangements permit, from the Patent Office, Southampton Buildings, London, W.C.2, at 1s. each. Higher priced photostat copies are generally available.

Complete Specifications Accepted

Gas discharge electric lighting systems and transformers therefor.—Solar Manufacturing Corporation. June 2, 1944. 601,991.

Manufacture of azo-dyestuffs.—Soc. of Chemical Industry in Basle. Nov. 16, 1943. 602,170.

Production of melamine.—American Cyanamide Co. Nov. 24, 1943. 601,967.

Extraction of alumina from its ores.—F. B. Dehn. Dec. 8, 1944. 601,968.

Electrolytic recovery of tin from solutions containing the same.—S. Elmore & Co., H. L. Malan, J. A. Stocker, and P. E. Mann (legal representatives of A. S. Elmore (deceased).) Jan. 24, 1945. 602,245.

Electrolytic deposition of metals from solution containing the same.—S. Elmore & Co., H. L. Malan, J. A. Stocker, and P. E. Mann (legal representatives of A. S. Elmore (deceased).) Jan. 24, 1945. 602,247.

Separation of nickel sulphide from copper sulphide.—Mond Nickel Co., Ltd. (International Nickel Co., Ltd.) Feb. 16, 1945. 602,028.

Production of high strength malleable iron alloy castings.—Der Eisen-Und Stahlwerke Vorm. G. Fischer A.G. March 23, 1944. 601,975.

Process for the regeneration of caustic alkali solutions containing mercaptans.—Shell Development Co. April 15, 1944. 601,978.

Process for removing burrs, slivers and fine metal particles from ferrous laminations.—Westinghouse Electric International Co. April 20, 1944. 601,980.

Method of and apparatus for removing metal from ferrous metal bodies.—Linde Air Products Co. July 28, 1944. 601,982

Manufacture of aminotriazine-aldehyde reaction products.—Monsanto Chemical Co. May 6, 1944. 601,983.

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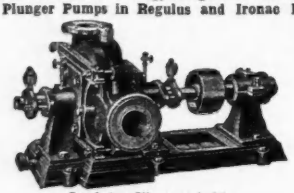

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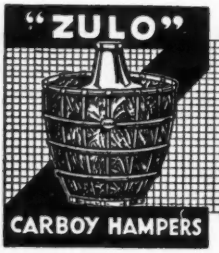

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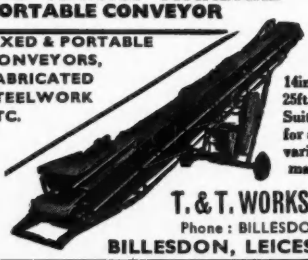
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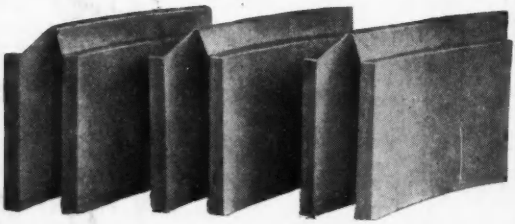

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